TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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MALARIA.

PEARSON (A. E.) & MOUCHET (R.). **Malarial Fever in the Belgian Congo.**—*S. African Med. Rec.* 1917. Feb. 24. Vol. 15. No. 4. pp. 49–61.

In the main this is an essay on the subject of malaria, interesting but not going much beyond familiar paths.

The authors' experience in the Belgian Congo has been confined to subtertian malaria. Dangerous forms of the disease have not been common, but masked forms—localised pains, stubborn constipation, anaemia and lassitude, facial neuralgia, and adenitis—have been met with frequently.

Methods of administering quinine, which in the authors' opinion should be given as soon as the diagnosis is established, are discussed, as also are the uses of various preparations of arsenic and the treatment of complicating symptoms.

The original paper should be consulted for its abstracts of cases illustrating treatment of obstinate malaria.

A. Alcock.

NICLOT. **Le paludisme en Grèce, en Macédoine et à l'Armée d'Orient.**—*Arch. Méd. et Pharm. Milit.* 1916. Dec. Vol. 66. No. 6. pp. 753–774.

This is an interesting essay well worth reading though it contains nothing new. It deals with malaria in Macedonia in all its aspects, endemic, clinical and therapeutic, and prophylactic. The parasite most frequently found in the laboratory was *P. vivax*; *P. falciparum* was also frequent, but the quartan parasite was met with only once. The commonest Anopheles was *A. maculipennis*; a few *A. sinensis* and *A. superpictus* were seen in certain places, but *A. bifurcatus* was not found.

Whatever other preventive measures may be attainable, quinine and mosquito-nets, for an expeditionary force, come first. It is also important to get the men interested in the massacre of adult mosquitoes. The prophylactic dose of quinine was 25 cgm. daily with the matutinal coffee, a double dose being given every other day in badly infected places. Sanitary corps looked after breeding-places of mosquitoes,

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ground around camps was cleared and cultivated, watering-places were protected by gratings. Wherever in endemic areas there is an infected population in propinquity to troops anti-malarial sanitation must be extended accordingly.

A. A.

MOREAU (Laurent). **Paludisme et traumatisme chez les blessés de l'armée d'Orient.**—*Bull. Acad. Méd.* 1917. Jan. 2. 3 ser. Vol. 77. Year 81. No. 1. pp. 48–50.

Most of the wounded sent home from the Army of France in Macedonia suffer from attacks of malaria, which though often clinically unambiguous are sometimes confused with the fever of septic infection. The author, by methodical examination of the blood, has been able to verify the fact that traumatism not only revives malaria in latent cases but also may be the exciting cause of a first attack.

A. A.

GRALL (Ch.). **Paludisme "épidémié."**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 184–208. With 11 charts.

Malarial fever was the prevailing malady of the French army in Macedonia in 1916, overwhelmingly so from July to mid-October. The author distinguishes and classifies fevers of primary infection, of all degrees of intensity from mere indisposition to typhoid severity; fever of schizogony; fevers of recrudescence; cachexia of acute malarial fever; and paroxysmal haemoglobinurias. The contribution is of a systematic and doctrinal kind rather than original.

A. A.

ANDRUZZI (A.). **Le forme parassitarie malariche predominanti fra le truppe sul fronte Albanese.** [The Forms of Malarial Parasites predominating among the Troops on the Albanian Front.]—*Ann. Med. Nav. e Colon.* 1916. Nov.-Dec. Year 22. Vol. 2. No. 5–6. pp. 568–569.

The author examined the blood of 300 cases of malaria occurring among Italian troops employed in Albania, during the months of August and September 1916. The varieties of parasite found were as follows:—

Laverania praecox	.. ..	98 per cent.
Plasmodium vivax	.. ..	2 per cent.
Plasmodium malariae	.. ..	In one case only out of the 300.

One half of the cases of benign tertian (*P. vivax*) came from the interior (Valona) where, it may be presumed, the type of malaria existing is milder than that met with on the coast.

J. B. Nias.

RENAUX (E.). **Fièvre paludéenne des Flandres. Quelques remarques sur la ponctuation basophile des hématies.**—*Arch. Méd. Belges.* 1917. Jan. Vol. 70. No. 1. pp. 24–33. With 11 charts.

The author shows that as a result of defensive inundations and the general upset of sanitary equilibrium in Belgium, many tracts where

malaria had been kept in subjection—though not altogether extinguished—by drainage, cultivation, etc., have again become malarious.

Clinically this malarial relapse has been distinguished by its protean variability and disguise, chiefly in the form of affections of the respiratory system and of gastritis; a typical malaria temperature-curve has been quite exceptional. But the effect of quinine has been rapid and complete.

The malaria-parasites themselves have exhibited marked variability, in size, form, schizogony, and stain-reaction. Crescents have not been found. The occurrence of basophile dots in the red-blood cells has been remarkably frequent.

A. A.

Brule (M.) & Jolivet (L.). **Cinq cas de paludisme autochtone apparus simultanément dans une ferme belge. Traitement du paludisme par le novarsénobenzol.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 4. 3 Ser. Vol. 32. No. 37–38. pp. 2304–2310.

None of the subjects of these cases had been out of France, or had lived in malarious parts, or had suffered from malaria before; the infection was contracted in an isolated farmstead in marshy mosquito-haunted country near the Belgian frontier. One case was treated exclusively with intravenous injections of salvarsan, neo-salvarsan and novarsenobensol, with good results; and the authors recommend a trial of this treatment, although they think that the association of novarsenobenzol and quinine has advantages.

A. A.

Roubaud (E.). **Cas de Paludisme autochtone contracté dans l'Aisne.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. p. 171.

Statement of a case of benign tertian in a soldier coming from Central France who had never suffered from malarial fever before, or been in the colonies, or been in contact with colonial troops. Parasites were found in his blood at the time of the first attack and also nearly six months afterwards.

A. A.

Carnot (Paul). **Les Bilieuses paludéennes.**—*Paris Méd.* 1917. Mar. 3. Vol. 7. No. 9. pp. 169–176.

In the author's view the implication of the liver in malarial infections is—as in the case of the spleen and bone-marrow—a consequency of its vascularity, and is to be explained by the avidity of the malaria-parasite for haemoglobin, whether this commodity be in the red blood cells themselves or in the organs where they are elaborated or degraded. In early malarial infections the liver—like, though less than, the spleen—is enlarged; in chronic malarial infections it becomes indurated and infiltrated with pigment.

The extent to which the liver is implicated depends perhaps upon the intensity of the infection and upon the specific parasites, and dealing merely with the clinical phenomena the author arranges *bilieuses paludéennes* in a series of increasing gravity, as follows:—

(a) *Bilieuses intermittentes*, met with in benign tertian infections, and characterised by bilious vomiting, colic, bile-coloured stools, and

a certain amount of jaundice; the attacks, like the rigors and the rises of temperature associated with them, are intermittent, and are best treated with quinine and ipecac.

(b) *Bilieuses rémittentes et continues*, met with in subtertian infections. The attack begins with muscle-aches and headache, and the fever is seldom preceded by shivers. There is painful and intractable vomiting, often of pure bile, abdominal cramp, diarrhoea with bile-stained evacuations, rapid and intense jaundice; liver is much enlarged, and the urine is scanty and dark coloured. Severe cases pass into a typhoid state.

(c) *Bilieuses hémorragiques*, when the malarial infection is intense. Here various haemorrhages—haematemesis, haematuria, epistaxis, haemorrhage from the gums, purpuric eruptions—may coincide with or may succeed the biliary symptoms outlined above.

(d) *Bilieuses hémoglobinuriques*, sudden in onset. The author here discusses the current theories of the aetiology of blackwater fever, which he is inclined to regard as one extreme of this series of *ictères paludéens*.

A. A.

White (R. O.). **A Note on Some Cases of Intestinal Malaria.**—*Report of the Accra Laboratory for 1915.* pp. 47–48. [1916.] London: J. & A. Churchill.

Beyond its intrinsic interest this is a very pithy and instructive homily, gracefully inculcating early examination of the blood. It is based mainly on 14 cases that occurred among Europeans at Sekondi, within a term of a few weeks, all of which began with vomiting and painful diarrhoea suggesting the effects of vitiated food, but "responded quickly without the assistance of any other medicine than quinine"—a fortunate examination of the blood in the first cases having revealed the presence of subtertian parasites. In one institution all the Europeans, six in number, were attacked, and the blame was attributed to the water; it was afterwards discovered that some of the native staff had also suffered in the same way.

In another case, independent of this epidemic, the abdominal pain was so acute that morphia had to be given, and ice was necessary to check the retching. This treatment gave relief, but in the afternoon of the next day all the symptoms returned acutely, and were again relieved by the same treatment. The temperature being high, an examination of the blood was made and a heavy malarial infection was discovered, parasites in three distinct stages being visible.

A. A.

Brosius (Otto T.). **A Report of an Unusual Case of Cerebral Malaria.**—*Jl. Amer. Med. Assoc.* 1917. Jan. 13. Vol. 68. No. 2. pp. 106–107.

The patient, a girl of 11 years, was admitted with a history of malaise, headache, chills, continued high fever, and convulsions, followed by paralysis of right side of body. When admitted she lay supine and semiconscious, with head retracted, eyes rolling upward, neck rigid and tender, right arm and leg paralyzed and flaccid, Kernig's sign on left side, and knee-jerks not procurable. Examination by lumbar

puncture showed clear fluid from which no organisms were obtainable. Examination of blood showed crescents and rings. After calomel, followed by Mag. Sulph., methodical treatment with quinine by mouth was carried on. The day following admission the temperature fell to 98·2° F., and the supposed hemiplegia disappeared, though in the afternoon slight convulsions were reported. On the third day there was a slight rise of temperature, of short duration. On the fourth day the patient had practically recovered.

A. A.

LAVERAN (A.). **Sur le traitement du paludisme à propos des fièvres de Salonique.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 208–216.

The distinguished author states that the malarial fevers, remarkable for their severity, that have been prevalent at Salonica, are not, as some have thought, new types of the disease, but are ordinary malaria aggravated by the intensity of the infection and by the diminished resistance—a consequence of arduous field service—of the individuals infected.

For the rest, this interesting paper is of an advisory kind, dealing with the various modes of administering quinine, the pre-eminent efficacy of which drug, provided it be systematically used and continued until parasites have disappeared, the author regards as abundantly proved. Administration by the mouth he considers to be the best method, generally, in dealing with a multitude of simultaneous cases in an endemic area.

A. A.

SOULIÉ (Henri). **Traitement du paludisme.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 217–247.

In this important paper the author generalises his experience of 436 hospital cases (276 subtertian, 138 benign tertian, 15 quartan, 7 double infection) treated in Algeria, in 1915–16. Three preparations of quinine were tested, collobiase, bihydrochlorate, and basic hydrochlorate with urethane. All methods of administration were tried. The rectal method gave no results and was badly borne, the hypodermic method was abandoned as too painful, and the method by the mouth was renounced as being too trying for the stomach and sometimes too protracted. The methods most approved were the intramuscular and the intravenous, and of these a very precise account is given, describing the technique adopted, the effect on the parasites, the rate of elimination in the urine, and the therapeutic results.

For intramuscular (gluteal) injections 1 gm. of basic hydrochlorate with 0·50 gm. urethane in 3 gm. of distilled water was used, two such injections being given twice daily, three days in the week, for four to six weeks. The action on the intracorpuscular forms of the parasites was very rapid; they were rarely observed after the third day. Crescents however were sometimes found after three weeks. The haemolytic action sometimes attributed to quinine could never be demonstrated. An enlarged spleen was always reduced rapidly.

For intravenous injections the same amount of quinine was used, in the same periods, the preparation of quinine being the basic

hydrochlorate with urethane, or the bihydrochlorate or the collobiase (Maison Boulanger-Dausse). A large amount of solvent was used, artificial serum being sometimes employed, and the injection was effected slowly (10 minutes). The action on the parasites was even more rapid than with the intramuscular method, and crescents were very rarely found after the 15th day. The collobiase appeared to have a marked effect upon the development of the parasites.

A. A.

de Kerdrel (A.) & Carnot (P.). **Les injections intraveineuses de quinine dans le traitement du paludisme primaire.**—*Paris Méd.* 1917. Jan. 6. Vol. 7. No. 1. pp. 2–9. With 2 charts.

Carnot (Paul) & de Kerdrel (A.). **Les injections intraveineuses de quinine dans les accidents précoces du paludisme.** *Bull. et Mem. Soc. Méd. Hôpit. de Paris.* 1916. Dec. 21. 3 Ser. Vol. 32. No. 35–36. pp. 2005–2021.

The authors generalize their experience of the intravenous administration of quinine in cases from Macedonia in which the primary malarial infection dated several weeks, sometimes several months back. From the virulence of the cases and the multiplicity and gravity of their complications the authors conclude that malaria in Macedonia is of tropical intensity.

The following is the prescribed injection :—Basic chlorhydrate of quinine 0·4 gm., urethane 0·2 gm., distilled water 1 cc. diluted with 20 cc. of normal saline solution.

In grave asthenic cases the injection is diluted further with physiological serum.

The injection should be made very slowly, particular care being taken that none of it escapes into the subcutaneous tissue. No ill effects were observed, except that in cases complicated by haematuria there might be a slight recrudescence of that symptom.

In all the multifarious cases classed as early pernicious the results were magnificent. Good results, after perseverance, were observed in simple but grave infections and relapses. In apyretic cases marked by visceral complications the intravenous method had no pre-eminent advantage.

The authors while emphasizing the quickness and thoroughness of the action of quinine in intravenous injections, admit that such injections even in greater strength have no extraordinary effect upon the resistant forms of the malaria parasites, such as crescents in particular.

A. A.

Richet & Griffin (Walter B.). i. **The Treatment of Malaria and Malarial Coma by Intravenous Injection of Quinine Urethane.**—*Brit. Med. Jl.* 1917. Feb. 10. pp. 190–191.

ii. **Le traitement des formes pernicieuses de paludisme par les injections intraveineuses de quinine.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 4. 3 Ser. Vol. 32. No. 37–38. pp. 2268-2281. With 8 charts.

i. This treatment is considered by the authors to be the only remedy for malarial coma, and also to be very effective in chronic forms of

malaria. In cases of rapidly developed coma, where numerous gametes and schizonts were found, recovery would be complete in 12 to 24 hours, and gametes and schizonts would be hard to find in 48 hours, sometimes after a single injection. The formula, as expressed by the authors, is: chlorhydrate of quinine 0·4 cc., urethane 0·2 cc., distilled water 1 cc., to which is added 14 cc. of warm physiological serum. The injection is made very slowly; if the patient be conscious at the time it may cause slight giddiness and buzzing in the ears, but not any pain. In only one of a series of seventy cases was there any ill effect—a slight thrombosis of a vein.

ii. The authors describe their method of intravenous administration of quinine and give abstracts and clinical charts of comatose and other grave cases of malaria so treated. The essentials are, besides asepsis, dilution and slow injection. The drug may also be given by mouth, or subcutaneously, at the same time as, though not at the initial stage of, the intravenous injections. A. A.

WARD (J. F.). **The Intravenous Injection of Quinine.** [Correspondence.] —*Lancet.* 1917. Mar. 17. p. 428.

Drawing attention to colloidal quinine, the advantages of which are that in 1 per cent. solution it is on the alkaline side of neutrality, and that its absorption is much slower and its action therefore more sustained. A. A.

LAVERAN (A.). **Presentation de pièces anatomiques. Nécrose d'une partie des muscles fesssiers à la suite d'injections hypodermiques de quinine.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 162–163.

The patient was a soldier treated in hospital at Salonica for paratyphoid and malaria who received in 20 days 40 hypodermic [? intramuscular] injections of quinine-urethane in sealed ampoules (amount not known) in the buttocks. When convalescent he was repatriated. The buttocks became indurated and then soft, when incisions were made under chloroform. There was evacuated chocolate-coloured pus and mortified shreds of the gluteus maximus free in the cavity. One fragment sent to Laveran measured 10 × 3 × 2 cm. The muscular structure could be recognised; the tissue was as if hardened in alcohol. The author has never seen such extensive necrosis after quinine injections; in this case there was paratyphoid also and too many injections seem to have been given in one spot. In spite of the vigorous treatment the patient had several relapses of malaria in France. Laveran adds that such occurrences should not condemn quinine injections, "which are very valuable in the treatment of malaria," but show the importance of combining the injection and ingestion methods and the necessity of using solutions sufficiently dilute.

It is not stated whether the pus was examined for quinine.

A. G. B.

LOW (George C.) & NEWHAM (H. B.). **Intravenous Injections of Antimony in the Treatment of Malaria.**—*Brit. Med. Jl.* 1917. Mar. 3. p. 295.

The observations were made on a patient with a heavy crescent infection, and were carried on for 36 days. The patient was kept in

bed, and every day at the same hour a well-spread film was methodically examined within the limits of distribution of 500 leucocytes. For the first 22 days the patient was treated with injections of tartrate of antimony; six injections were given altogether, at regular intervals, beginning with 1 grain and gradually increasing to 2½ grains. Antimony had no effect upon the crescents, their number fluctuating irrespective of the injections. In addition to crescents rings were scantily present, nor were they affected by the antimony. Afterwards the antimony was stopped and the patient was treated with quinine (10 grains twice a day) and liquor arsenicalis (2 up to 4 minims thrice a day) and as a result the number of crescents was greatly diminished and the rings disappeared.

It was ascertained, by observations *ad hoc*, that the crescents were alive and active.

The entire series of observations is tabulated in detail. The authors are cognizant of the risks of generalising from one particular case [see this *Bulletin*, Vol. 9, p. 306]. A. A.

Sierra Leone. **Treatment of Malaria with Amylopsin and Trypsin.** [D. Burrows, Acting P.M.O.]—MS. Report. Received in Colonial Office 2nd February 1917.

The Acting P.M.O. of Sierra Leone (Dr. D. Burrows) communicates, through the usual official channels, a report from Dr. J. C. Murphy, in collaboration with Dr. J. Y. Wood and Dr. W. A. Young, on amylopsin-trypsin and galyl in the treatment of malaria.

In his review of the report the P.M.O. notices that amylopsin and trypsin were shown to give no better results than quinine, but he invites particular attention to an intractable case of subtertian in which eventually galyl was tried. In this case—a European heavily charged with crescents—full amylopsin-trypsin treatment (subsequent to unsuccessful administration of quinine) had no effect, but the day after an intravenous injection of 2 gm. of galyl only a single crescent could be found in the blood examined, and that one appeared to be unhealthy, and at subsequent examinations no crescents were seen.

A. A.

i. Stanton (A. T.) & Hacker (H. P.). **The Anopheles of Malaya. III. A New Variety of *A. albotaeniatus*, Theo.**—*Bull. Entom. Res.* 1917. Jan. Vol. 7. Pt. 3. pp. 273–275. With 1 text fig.

ii. Strickland (C.). **A New Species of Protanopheline from Malaya, *Myzorhynchus hunteri*.**—*Indian Jl. Med. Res.* 1916. Oct. Vol. 4. No. 2. pp. 263–270. With 5 text figs.

iii. Strickland (C.). **An *umbrosus*-like Anopheline from Malaya. *Myzorhynchus novumbrosus*.**—*Ibid.* pp. 271–273.

iv. Christophers (S. R.). **A New Anopheline with Unspotted Wings from Mesopotamia (*Anopheles lukisii*).**—*Ibid.* 1916. July. Vol. 4. No. 1. pp. 120–122.

v. Christophers (S. R.) & Khasan Chand. **A Tree-Hole Breeding Anopheles from Southern India: *A.* (*Coelodiazesis*) *culiciformis* Cogill.**—*Ibid.* Apr. Vol. 3. No. 4. pp. 638–645. With 1 plate.

i. *Anopheles albotaeniatus* Theob. var. *montanus* Stanton and Hacker: a large dark-coloured variety, palpi unbanded, costa dark-scaled

with two yellow spots, abdomen without scales, hind legs having the fifth tarsal segment all yellow and narrow yellow bands at both ends of all the other tarsal segments. The larva has a branched hair at the shaft of the antenna, the antero-external clypeal hairs with few branches, and well-developed cockades on the 3rd to the 7th abdominal terga. The larvae were found, along with those of *A. leucosphyrus* Donitz and *A. aitkeni* Theob., and occasionally *A. umbrosus* Theob., in shady pools in the course of a jungle stream 600 ft. above sea level.

ii. *Anopheles* (*Myzorhynchus*) *hunteri* Strickland, might have been regarded as a variety of *A. sinensis* Wied., but for its constancy, and for its larva. The distinguishing characters of the male are the creamy white palps with two narrow dark bands in the distal half; of the female the tawny-coloured bands of the palps together with the absence of a tuft of scales on the 7th abdominal sternum. The larva like that of *A. umbrosus* has no true cockades on the abdominal terga, but the posterior clypeal hairs are long and simple.

iii. *Anopheles* (*Myzorhynchus*) *novumbrosus* Strickland. The adult is like *umbrosus* Theob., but is smaller, has relatively shorter hind-legs, and slenderer palps, and is of a greyish-black colour. The larva differs from *umbrosus* in having typical cockades on the abdominal terga.

iv. *Anopheles lukisii* Christophers, has typical cuneate Anopheline head-scales, except anteriorly where there are some tiny flat scales, and in this respect, as well as by its larger size and lighter colouring, is distinguished from *A. aitkeni* James; from *A. culiciformis* Cogill, it is distinguished by its slender palps and by the presence of narrow bands on the tarsal joints; and from *A. bifurcatus* by the absence of the projecting frontal tuft of white hairs. Caught in the act of biting, at Amara on the Tigris.

v. *Anopheles* (*Coelodiazesis*) *culiciformis* Cogill, is here shown to be, like *A. plumbeus* Halliday and *A. barberi* Coquillett, a species that breeds in water that collects in holes in trees. The larva, which appears to be carnivorous, like those of the other two species of similar habitat, can be distinguished from that of *A. plumbeus* by the "extraordinary expanded palpiform structure" that represents the basal hair of the antenna. The larvae here described were found in November in the Wynaad jungle in the district of Malabar, and only in holes in trees. No adults were found.

A. A.

Schueffner (W.). **Die Brutplätze der Mücken, deren Behandlung und kurze Bemerkungen über die Aussichten einer Malariabekämpfung.** [The Breeding Places of Mosquitoes, their Treatment and the Prospects of a Malarial Prophylaxis.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 7. pp. 1013–1026.

The author reviews at considerable length the additions made in recent years to our knowledge of the breeding-places of Anopheles mosquitoes, and points out that some of these breeding-places are not such as can be influenced by drainage works.

A. A.

Dudgeon (Leonard S.) & Clarke (Cecil). **On the Cultivation of the Malarial Parasite** *in vitro*.—*Lancet.* 1917. Apr. 7. pp. 530–531.

The culture media used contained sodium citrate 1·5 per cent. and glucose variously 2·5, 5, 7·5 and 10 per cent. The method followed

was to add 1 to 2 cc. of blood drawn from a vein to 10 cc. of the medium, and to incubate the mixture for 20 to 24 hours at 40° C. Films were then made from the uppermost layer of corpuscles after the supernatant fluid had been pipetted off.

The results of 51 cases are tabulated: 18 were malignant tertian and in 14 of these an increase of parasites—which in 11 cases was a "marked" increase—was observed in the cultures, the increase being estimated by comparison with the corresponding original blood-films. No increase was observed in cultures of benign tertian or of quartan parasites. The culture-forms were chiefly small deeply-staining (Giemsa) semi-lunar bodies, with a nucleus showing as a bright red dot, suggestive of merozoites.

The authors discuss the question whether the increase is merely apparent and due to concentration of the red blood-cells in the culture tube, or is a real multiplication, but they do not at present undertake to decide it, being content that the method is an undoubted aid to diagnosis. For in 7 out of 10 cases, where a diagnosis could not be made from ordinary blood-films, films made from cultures showed parasites, in four instances plentifully.

The title of the paper is perhaps more unconditional than the argument.

A. A.

Macfie (J. W. Scott). **The Deflexion of the Arneth Count in Malaria: Additional Observations.**—*Report of the Accra Laboratory for 1915.* pp. 64–67. With 1 chart. [1916]. London: J. & A. Churchill.

This is of the nature of an appendix to the author's paper on the nuclear variations of the neutrophile leucocytes (Arneth counts) in malaria [summarised in this *Bulletin*, Vol. 7, p. 336]. It consists of tabulated numerical statements with explanatory comments which cannot be further summarised.

A. A.

BLACKWATER FEVER.

Stephens (J. W. W.). **Studies in Blackwater Fever. V. On the Importance of furnishing Population Statistics in Connexion with Cases of Blackwater Fever.**—*Ann. Trop. Med. & Parasit.* 1916. Dec. 16. Vol. 10. No. 3. pp. 345-356.

This is a paper not to be summarised, but to be advertised in proper places, even by beat of the local official drum.

After illustrating by examples the desperate sterility of much that is contained in the medical records regarding the incidence, distribution, individual pre-disposition, etc. of blackwater fever, it explains in the form of concise statistical tables the manner in which all such data should be recorded if they are to be of any use in working out the aetiology of the disease.

A. Alcock.

Hintze (K.). **Zur Theorie des Schwarzwasserfiebers.**—*Deut. Med. Woch.* 1916. Sept. 28. Vol. 42. No. 39. pp. 1186–1187.

The author, while believing that blackwater fever as connected particularly with malaria has no constant and uniform aetiology, invites consideration of one possible theory of causation which he thinks is deserving of investigation. The theory is that radiant energy in the form of light, with the concurrence of quinine and waste-products of the malaria parasites acting together as sensibilising substances, causes haemolysis.

He states as facts that light has a haemolytic action, which can be increased by sensibilising substances, namely by eosin, by quinine-salts, by bile-pigment and by degeneration products of haemoglobin, particularly haematoporphyrin.

The first step, as he points out, is to test experimentally whether the blood of "blackwater-fever-candidates," as he terms them, is peculiarly sensitive to light-rays.

A. A.

Hobson (H. G.). **Notes on a Case of Haemoglobinuric Fever in Swatow.**—*China Med. Jl.* 1916. Nov. Vol. 30. No. 6. pp. 413–414.

The author remarks on the rarity of haemoglobinuric fever in China,* and gives a short abstract of two cases—one in a Chinese woman of 60 years, the other in a European. In both cases the attack was precipitated by quinine. The first case was treated with quinine, tannic acid, and finally neo-salvarsan; the second case was treated, with excellent results, with small doses (2 gr.) of quinine. Both cases recovered.

A. A.

* Maxwell states that blackwater fever has never been proved to exist in China (*Jl. Trop. Med. & Hyg.* 1916. Vol. 19. p. 237).—[Ed.]

Fleming (A. M.). **The Prevention and Treatment of Blackwater Fever.**—*Med. Jl. S. Africa.* 1916. Dec. Vol. 12. No. 5. pp. 79–80; and *S. A. Anti-Malarial Assoc. Publ.* No. 13; and *S. African Med. Rec.* 1917. Mar. 10. Vol. 15. No. 5. pp. 68–69.

The author describes the ordinary palliative and expectant treatment, insisting on absolute rest in bed, and recommending either small and frequent doses of liq. hydrarg. perchlor. and sod. bicarb., or six-hourly hypodermic injections of ½ gr. of methyl arsenate of soda.

The author states that he has never met with blackwater fever in a malarial patient who was fully and thoroughly under the influence of quinine.

A. A.

Dunley-Owen (A.). **A Note on the Treatment of Haemoglobinuric Fever.**—*S. African Med. Rec.* 1917. Feb. 10. Vol. 15. No. 3. pp. 39–40.

According to the author quinine should not be given in any form, and the best medicine is liq. hydrarg. perchlor. ½ dram, ammon. chlorid. 2½ gr., sod. bicarb. 5 gr., in an ounce of water, every two hours until the urine is clear. Pyrexia should be treated by sponging, anuria by saline rectal injections, constipation by simple enemata, vomiting by cocaine. The diet should be extremely light until convalescence is assured, when it may be gradually increased. The patient should be kept in bed for three weeks or a month, and should take an iron tonic for two months afterwards.

A. A.

ENTERIC FEVERS IN THE TROPICS.

MARTIN (C. J.). **Concerning the Pathology and Etiology of the Infectious Jaundice Common at the Dardanelles, 1915.**—*Brit. Med. Jl.* 1917. Apr. 7. pp. 445–447.

Readers of this *Bulletin* will remember certain "papers" [SARRAILHÉ and CLUNET, Vol. 8, p. 73; ARCHIBALD and others, Vol. 9, pp. 1–4] in which an "infectious jaundice" occurred during an epidemic of paratyphoid infections. In most of the mild cases no organism was isolated by blood culture. In some of the severe cases *B. paratyphosus* B was obtained. It was thought that this bacillus might be the cause of the "infectious jaundice."

"In opening the discussion on cases of jaundice at Alexandria in November 1915, Professor Kartulis gave a brief survey of the varieties met with in Egypt and the Levant. He described two types of epidemic jaundice. The first is a disease of sudden onset with rigor, high temperature, intense headache, vomiting, and prostration. The liver becomes enlarged and tender, the urine contains albumin and casts. On the fourth or fifth day jaundice appears. Epistaxis, haematuria and petechial haemorrhages are characteristic features. Death occurs in 30 per cent."

"The milder type . . . resembles the disease encountered at Gallipoli . . . but in the Egyptian cases nephritis, epistaxis, etc. appear to be usual symptoms."

Professor KARTULIS has not found the causative organism in the cases he has seen.

The severe form resembles the infectious jaundice of Japanese miners, shown by INADA, HOKI and others to be due to *Spirochaeta ictero-haemorrhagiae* (? = *Sp. eurygyrata*) found also in 39 per cent. of rats in the mines.

The Gallipoli disease was milder, more infectious and "there was no reason to suppose that rats contributed to its dissemination."

Lieut.-Col. Martin searched for parasites at Lemnos, 1915, but failed to find anything except in one case where *B. typhosus* was isolated. As the result of further work Col. Martin draws up the following "Conclusions":—

"1. No parasites were discovered in blood films taken during the disease.

"2. Blood cultures were sterile unless the jaundice supervened during an attack of typhoid or paratyphoid.

"3. The observations made at No. 3 Australian General Hospital at Mudros do not support the conclusion of MM. Sarrailhé and Clunet at Cape Helles that the jaundice was merely a manifestation of paratyphoid fever." [cf. No. 2.]

[Since jaundice with or without "fever," nephritis, etc., is due to poisoning, obstruction or interference with the liver cells and bile duct system it may be due to many causes and to different parasites which would produce similar results. Diseases cannot and should not be treated in watertight compartments and it is quite as possible that an "infectious jaundice" may be due to *B. paratyphosus* B. as to spirochaetes and other infections.]

J. H. Tull Walsh.

Castellani (Aldo). **Nota sulle infezioni tifiche, paratifiche, paratifo-simili e miste nella zona adriatico-balcanica.** [Typhoid and Allied Infections in the Adriatic-Balkan Area.]—*Ann. Med. Nav. e Colon.* 1916. Nov.-Dec. Vol. 2. Year 22. No. 5–6. pp. 453–461.

True to his country's call the professor of tropical medicine in the University of Naples is now working as a medical officer in the Italian Royal Navy. He finds in the Adriatic and Balkan regions "as in other parts of tropical countries" a notable number of cases of atypical or mixed *enterica* infections:—"Typhoid + paratyphoid A"; "typhoid + paratyphoid B, or paratyphoid-like"; "paratyphoid A + paratyphoid B, etc." The cases studied have been classified:—

"1. Cases occurring in non-vaccinated individuals.
"2. Cases in persons vaccinated against typhoid.
"3. Cases vaccinated with double vaccine, typhoid + para. B.
"4. Cases vaccinated with triple vaccine, typhoid + para. A + para. B."

"In group one bacteriological research showed:—Typhoid, 48 per cent.; paratyphoid A, 16 per cent.; paratyphoid B, 19 per cent.; atypical para-like, 2 per cent.; mixed infections, 15 per cent.

"In group 2:—Typhoid, 11 per cent.; para. A, 30 per cent.; para. B, 33 per cent.; atypical, etc., 10 per cent.; mixed infections, 16 per cent.

"In group 3:—Typhoid, 9 per cent.; para. A, 4 per cent.; para. B, 6 per cent.; atypical, etc., 70 per cent.; mixed infections, 11 per cent." [? including group 4.]

Thus it would appear that the use of mixed vaccines predisposes to atypical infections.

Six species of bacillus were isolated "with the cultural characters of *B. paratyphosus* B; but serologically different. Three species with all the cultural characters of *B. paratyphosus* A, but differing serologically from para. A."

Professor Castellani considers that the following named bacilli, with others not yet classified, belong to the atypical section of the genus *Enterica*:—*B. paratyphosus* (Clunet, 1914) [this *Bulletin*, Vol. 8, p. 73]; *B. paratyphosus* (Raymond and Negre, 1913); *B. metatyphi*, Handelbaum (1913); *B. ceylonensis* A (Castellani, 1907); *B. ceylonensis* B (Castellani, 1907); *B. entericus* (Castellani, 1912); *B. paraentericus* (Castellani, 1912); *B. asiaticus* (Castellani, 1905); *B. asiaticus mobilis* (Castellani, 1914); *B. columbensis* (Castellani, 1905)."

To these may be added: *B. khartoumensis* (Chalmers and Macdonald, 1916 [this *Bulletin*, Vol. 9, p. 10] and the bacilli mentioned by Hadfield and others [*loc. cit.*, p. 1].

J. H. T. W.

Armitage (F. L.). **New Zealand General Hospital, Cairo. Report of Bacteriological Laboratory, November 1, 1915, to May 31, 1916.**—*New Zealand Med. Jl.* 1916. Dec. Vol. 15. No. 70. pp. 231–246. With 10 charts.

Only that portion of the Report compiled by Captain F. L. Armitage, N.Z.M.C., which refers to enteric fevers is considered:—

"Enterica."

"Incidence.—Total cases examined, 303; causative organism isolated in 93—equals 30 per cent.; total examinations made by culture, 1,160."

"Of the 93 cases in which the organism was isolated there were due to:—Typhoid, 7—equals 7·6 per cent.; Paratyphoid A, 75—equals 80·6 per cent Paratyphoid B, 11—equals 11.8 per cent."

Place of origin :—

	Total.	Typhoid.	Para. A.	Para. B.
From Gallipoli	151	4	34	1
From Egypt	152	3	26	10
	303	7	60	11

[It is not explained why the figures for Para. A in the " table " differ from the number (75) given in the second paragraph quoted.]

" Anti-Typhoid Inoculation.—Of the 303 cases of enterica, 140, or 46·2 per cent., had been inoculated against typhoid with N. Z. vaccine only ; 149, or 49·1 per cent. had N. Z. vaccine and were re-inoculated with R.A.M.C. vaccine ; 2 or 0·7 per cent. not inoculated ; 12, or 4 per cent., had no record."

" The great majority of the 303 cases undoubtedly were paratyphoid and against this neither the N.Z. nor the R.A.M.C. anti-typhoid vaccine could afford any protection, but with regard to the typhoid cases the figures indicate that whatever may have been the protection afforded by the N.Z. vaccine, the R.A.M.C. vaccine afforded no appreciably better result."

" Mortality.—There were only three deaths in the 303 cases—a mortality of 1 per cent. In two of the three the typhoid bacillus was isolated, and the third case was clinically a typical typhoid but the causative organism was not found. . . . It is only reasonable to assume that but for the efficient antityphoid inoculation the incidence of typhoid would have been as great or greater than paratyphoid, with a proportionately high mortality."

" Agglutination Tests for Enterica :—

Widals.	Total.	Typhoid.	Para. A.	Para. B.	Negative and Doubtful.
In cases in which causative organism was isolated ..	46	1	17	6	22
In cases in which causative organism was never isolated.	50	2	21	6	21
	96	3	38	12	43

Total tests made, 170.

J. H. T. W.

BAKER (S. L.). **The Effect of Inoculation upon the Agglutination Reactions for Typhoid Fever and the Diagnosis of this Disease in Inoculated Persons.**—*Jl. Roy. Nav. Med. Serv.* 1917. Jan. Vol. 3. No. 1. pp. 19–29. With 4 charts & 1 diagram.

The author deals with " the results of agglutination tests performed at the Royal Naval Hospital, Haslar, on about 1,000 inoculated men from the Gallipoli region."

Conclusions :—

"(a) *The Persistence of the Agglutination Reaction after Anti-Typhoid Inoculation.*—(1) In about a third of all inoculated persons the titre of the serum fell to below 1 in 25 in the first six months. . . .

"(2) In the majority of those giving a persistent positive after inoculation the titre was 1 in 50 or less ; of those inoculated twelve to eighteen months previously 17·2 per cent., giving agglutination in 1 in 25 and 20·8 per cent. in 1 in 50. A smaller proportion of cases, about 13 per cent., gave an agglutination in 1 in 125 which persisted for more than six months, but, in the majority of cases, dropped below this after a year.

"(3) Those showing a titre of 1 in 250 and over represent two classes :—(a) Those in which the reaction is due to typhoid infection, and (b) those in which it is due to inoculation In inoculated persons showing 1 in 250 and over due to inoculation this titre was rarely maintained for more than six months. In those cases in which the period since inoculation was more than six months, a titre of 1 in 250 was the result, in the vast majority of cases, of typhoid infection.

"(b) *The Diagnosis of Typhoid in Inoculated Persons.*—The figures given in this paper represent the average for a large number of cases, by far the greater proportion falling within the limits described. No account is taken of individual peculiarities. Hence, although we may not be able to diagnose typhoid or the absence of typhoid in any particular inoculated person, diagnoses made on these lines will give a true picture of the incidence of typhoid in a large series of cases." [The clinical symptoms if recorded should be of the greatest help and should be consulted in all cases if possible.]

"(1) In general the serum must give a positive reaction in a dilution of at least 1 in 250 before it is possible to diagnose typhoid fever in inoculated persons on an agglutination test alone.

"(2) Even a positive in this dilution in a recently inoculated person (within six months) is not, as a rule, the result of typhoid infection but of inoculation."

"In those cases which had been inoculated twice, typhoid was diagnosed if the serum gave a positive in a dilution of 1 in 250 five months or more after inoculation."

The author then discusses cases which give a reaction of 1 in 125 after a year or more.

"It seemed reasonable to suppose that cases showing 1 in 125 after a year had elapsed since inoculation would contain a considerable number of typhoids, and in practice it was assumed that all such cases had suffered from typhoid.

"Working on the above scheme the number of cases of typhoid in the series of 1,024 cases was about 130 or 12·6 per cent.

"A series of 115 cases of uninoculated persons was collected . . . and there were, according to the agglutination tests, 32 cases of typhoid . . . a percentage of 27·6.

"We can therefore say that of those persons invalided home with intestinal disease not more than 12·6 per cent. of the inoculated had had typhoid, while at least 27·8 per cent. of the uninoculated from the same source had contracted the disease."

J. H. T. W.

Lévy (Pierre Paul). **Interprétation du séro-diagnostic chez les sujets non vaccinés et vaccinés contre la fièvre typhoïde.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Oct. 26. Vol. 32. 3 Ser. No. 27–28. pp. 1652–1671.

The author, a medical officer in the French Army, has, in 194 cases, compared the results of blood-culture with the serum reaction of Eberth's bacillus, *B. paratyphosus* A, and *B. paratyphosus* B. He

insists on a uniform technique and upon reliable strains of bacilli. His conclusions are as follows :—

" *In non-vaccinated persons* serum diagnosis retains its full value. One finds in such patients coagglutinins of a titre often as high as among the vaccinated.

" *In vaccinated patients* serum diagnosis has a great value. In order to obtain from this test useful and exact deductions, it is only necessary to consider that, following upon anti-typhoid vaccination, the serum of the patients necessarily acquires the power of agglutinating the bacillus of Eberth.

" In healthy persons, three or four months after the last inoculation the agglutination titre for Eberth's bacillus is nearly always clearly below 1 : 300.

" In persons suffering from diseases not of an enteric type, the same titre is not reached.

" In vaccinated cases of typhoid and paratyphoid fever, coagglutinations frequently accompany the specific agglutination.

" We interpret a triple serum diagnosis in a case clinically typhoid as follows :—

" Agglutination of Eberth's bacillus :—

" (*a*) In a person vaccinated less than three or four months previously one must pay no attention to a sero-agglutination with Eberth's bacillus of 1 : 300 or even above that.

" (*b*) In a patient vaccinated more than three or four months previously an agglutination of 1 : 300 with Eberth's bacillus would cause one to suspect a typhoid infection in the absence of a high coagglutination with *B. paratyphosus* A or *B. paratyphosus* B. A lower titre will not eliminate the possibility of some other disease and one must decide according to the agglutinations with paratyphoid A or paratyphoid B.

" Agglutination with *B. paratyphosus* B :—

" An agglutination of 1 : 200 indicates nearly always an infection with paratyphoid B in the absence of concomitant agglutinations of higher order.

" One rarely meets with paratyphoid A coagglutinins. At the beginning of paratyphoid B fever, a *B. typhosus* coagglutinin of a figure higher than the legitimate agglutinin may be met with ; further experiments some days after will put it in its true position.

" Agglutination of B. paratyphosus A :—

" It can be said, without risk of error, that an agglutination of any titre of paratyphoid A implies the presence of a paratyphoid A infection (agglutination from 1: 50)."

J. H. T. W.

Malaria e Malattie dei Paesi Caldi. 1916. Sept.-Dec. Vol. 7. No. 5–6. pp. 339–356. With 2 charts.—**Infezioni da bacilli paratifici. Febbre paratifoide. Tossi-infezioni da carni alterate.** [Paratyphoid Infections.]

A brief historical review of paratyphoid fevers and the bacilli which give rise to the toxic infections, followed by short paragraphs dealing with geographical distribution, symptoms, complications, prognosis, differential diagnosis, morbid pathology, preventive inoculation and general methods of treatment. The compilers appear to have investigated most of the literature which has contributed to our knowledge of paratyphoid infections during the war.

J. H. T. W.

BERRY (Charles White). **Paratyphoid Fever as observed during an Epidemic in the 14th N. Y. Infantry while on United States Service at the Mexican Border, 1916.**—*Med. Record.* 1917. Jan. 27. Vol. 91. No. 4. Whole No. 2412. pp. 135–140. With 1 chart.

The geographical distribution of typhoid fever is almost universal and paratyphoid fevers are gradually following in its track. The epidemic recorded by Dr. Berry was caused by *B. paratyphosus* A.

The force, consisting of 12 companies with Headquarters Staff, Supply and Medical Departments, arrived at Mission, Texas, on July 2nd, 1916. Subsequent research showed that there were some healthy "carriers" among the soldiers. The main source of infection was contaminated water:—

"Diarrhoeas without fever commenced almost from the first day in camp and averaged eight to ten daily.

"Diarrhoeas with fever commenced about ten days after arrival in July, and continued well into October.

"Diarrhoea cases stopped after leaving Mission.

"Fever cases continued (paratyphoid) until November, after the regiment arrived in Brooklyn (N.Y.), a large number of healthy 'carriers' being found, some of whom, later, came down with the disease."

An epidemic in Texas resembles an epidemic in France or Gallipoli; the details as to symptoms, treatment, protection and bacteriological investigation being, more or less, the same. There were in all about 300 cases among 1,000 men. "Fortunately there were no deaths although some of the cases were of severe type, the patients being very ill, with high fever, extreme prostration, etc."

To isolate the bacillus from faeces a dilution of brilliant green was used

"which practically inhibited all growth of the typhoid bacillus and the flora of the faeces (except the dye-resisting types), but had no influence on the growth of the test strains of paratyphoid A at our disposal. This dilution alone seemed safe, as the paratyphoid bacilli, as a rule, and the cultures from this outbreak in particular, were more resistant to the action of brilliant green than *B. typhosus.*

"The amount of dye varied with different batches of media, from 0·315 cc. to 0·5 cc. of a 1 to 1,000 solution of the dye to 1,000 of agar."

J. H. T. W.

MARRIS (H. Fairley). **The Use of Atropine as an Aid to the Diagnosis of Typhoid and Paratyphoid A and B Infections.** [Preliminary Note.]—*Brit. Med. Jl.* 1916. Nov. 25. pp. 717–720. With 13 charts.

"During the past year I have studied and recorded graphically the various cardiac irregularities met with in typhoid and paratyphoid fevers. In the course of this investigation, carried out on lines advocated by Sir James Mackenzie I was led to devote special attention to the relatively slow heart-rate which commonly occurs in this group of fevers. It is well known that atropine increases the rate of the heart by some twenty to forty beats per minute. I found that the rate of a slowly beating heart in each of these fevers was hardly accelerated at all by the injection of 1/33 grain of atropine sulphate, hypodermically."

"As I found that the failure of the heart to respond to atropine was so constant in all cases bacteriologically proved to belong to the typhoid group I began to use this reaction as a means of diagnosis."

Chart I.—Effect of hypodermic injection of $\frac{1}{33}$ gr. of atropine sulphate (A) upon the pulse-rate of a healthy man, aged 24, who was bacteriologically and serologically shown to be free from typhoid, paratyphoid A, or paratyphoid B infections. (Mackenzie polygraph.)

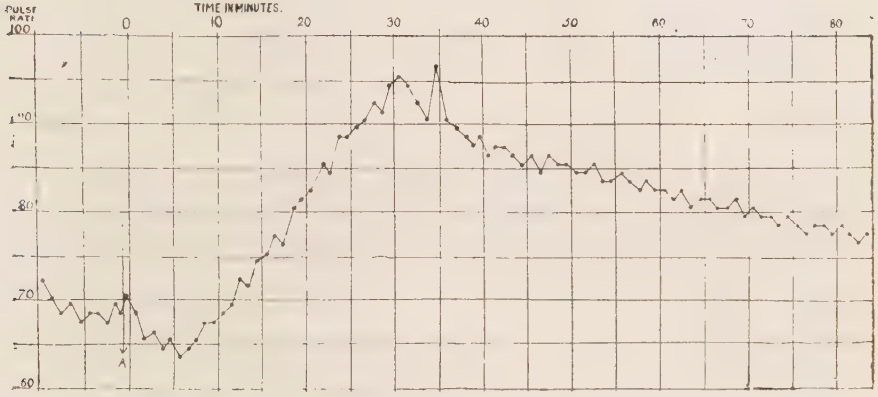
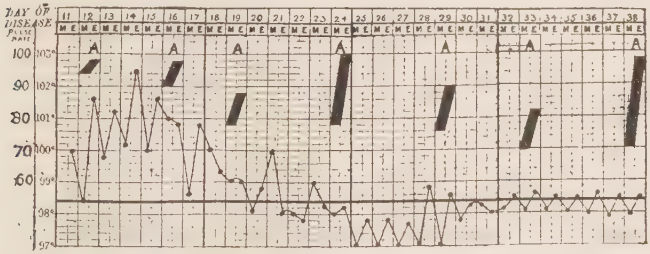


Chart IV.—Case of paratyphoid B. Fully inoculated, five months previously, against typhoid and paratyphoid A and B. Bacillus isolated from stools; agglutinations positive to *B. paratyphosus* B. A = Atropine $\frac{1}{33}$ gr.



Method of Making the Test.—"At least one hour after a meal should elapse. The patient should lie horizontally and be instructed to keep perfectly quiet throughout. The pulse-rate is then taken and recorded minute by minute until found to be steady. Usually ten minutes will be found to suffice for this; then 1/33 grain of atropine sulphate is injected hypodermically, preferably in the triceps region to ensure rapid absorption. The patient now remains absolutely quiet, and, after an interval of twenty-five minutes, the pulse-rate is again taken and recorded minute by minute until it is obvious that any rise which may have followed the injection of atropine has passed, and that the rate is falling to a lower level."

"As an arbitrary rule, an increase of the pulse-rate by about 20, or more, beats a minute after atropine may be accepted as an indication that the patient is probably not suffering from typhoid or one of the paratyphoid series. Should the pulse-rate increase only 10 beats or less the reaction is suggestive of an infection by one of these diseases."

"In the charts the numerals to the left of temperature figures denote the pulse-rate, ten corresponding to the interval between each degree of temperature. The thick dark bands denote the effect of the injection of

Charts I. and IV. reproduced by permission from the *British Medical Journal*.

atropine upon the pulse-rate on days shown, the lower end corresponding with the average rate before the atropine, the upper end to the mean highest rate reached after the atropine. The length of these dark bands consequently indicates the extent of 'escape' on acceleration."

Chart I. is given for comparison with Chart IV.

A list of "suspects," suffering from other diseases, is given and the author states that:—"In each case it will be noticed that at every observation the heart is seen to respond to the atropine in the normal manner."

J. H. T. W.

BASSETT-SMITH (P. W.). **The Incidence of Typhoid Fever and the Results of Anti-Typhoid Inoculation during the Second Year of the War, October, 1915, to October, 1916.**—*Jl. Roy. Nav. Med. Serv.* 1917. Jan. Vol. 3. No. 1. pp. 30–32. With 1 chart.

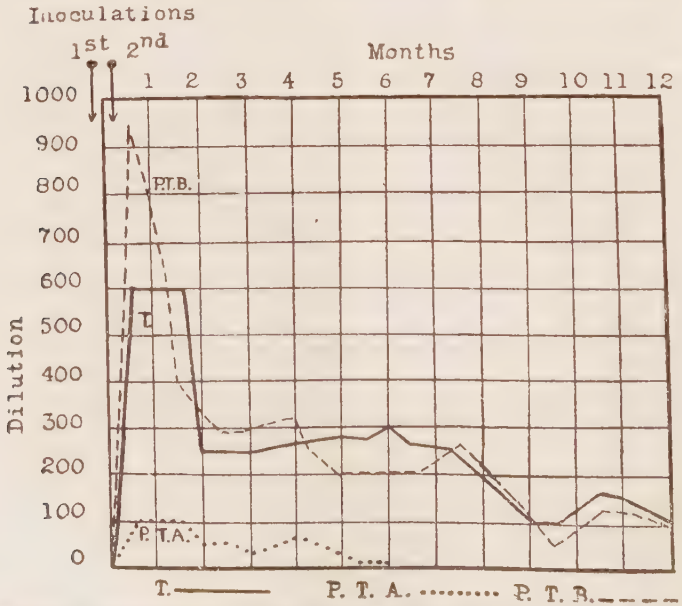
Fleet-Surgeon Bassett-Smith notes the incidence of enteric fevers and also states that "during the present year a triple vaccine . . . has always been used for those proceeding to the Eastern Mediterranean, Persian Gulf, Russia, France and Belgium."

"The composition of the triple vaccine prepared at Greenwich is:—

B. typhosus	.. ..	500 millions	per cc.
B. paratyphosus A.	.. .. ..	250 „	„ „
B. paratyphosus B.	.. .. ..	250 „	„ „

Two doses; 1 cc. for the first and 2 cc. for the second.

Agglutination Curve after Use of Triple Typhoid Vaccine.



[Reproduced by permission of the Editors of the *Jl. Roy. Nav. Med. Serv.*]

"The annexed curves show the immunity reactions over a period of one year, given by a laboratory attendant inoculated with two doses of the triple vaccine."

J. H. T. W.

Widal (F.) & Salimbeni (A. T.). **Réduction du nombre des injections employées pour la vaccination mixte antityphoïdique et antiparatyphoïdique A et B.**—*Presse Méd.* 1917. Jan. 4. No. 1. p. 1.

"Since the triple vaccine 'T.A.B.' has been employed, four injections are prescribed for men of the regular army and three for men of the territorial army and reserve."

There is no country that uses so many inoculations as France. "In America and Germany the number of injections is only three; in England only two." "Experience has shown that one could triple the number of bacilli in each dose without producing a more marked reaction." "But could one, with the object of reducing the number of injections, further increase the number of bacilli introduced into the system? The researches we have lately made permit us to reply in the affirmative."

"The vaccine employed is a simple emulsion of bacilli sterilized by heat in a 9 per 1,000 saline solution. The typhoid and paratyphoid A bacilli are heated for one hour at 56° C.; paratyphoid B is heated for one hour at 57° C.

"Prepared at the Pasteur Institute without any added antiseptic, this vaccine is so concentrated that 3 cc. contain ten thousand million germs. Using two injections in doses of 1 cc. and of 2 cc. with an interval of seven days, we introduce into the system nearly as many bacilli as with four injections, 7 cc. of the vaccine previously used, which contained 1,500,000,000 per cc.

"We have inoculated nearly 5,000 men with the stronger doses. These have not provoked any more reaction than that produced by the first two doses of the usual vaccine when four were given."

"By reducing the number of injections and, as compensation, increasing the number of bacilli we shall diminish the number of individuals sometimes incompletely protected because they were not able, for want of time, especially during active service, to receive the regulation four doses; we shall reduce the days of rest required by the vaccinated, and shall diminish the risks of reaction, since vaccine troubles are observed quite as often after the third and fourth injections as after the first dose."

J. H. T. W.

Rho (Filippo). **Primi risultati della vaccinazione antitifica obbligatoria nella Regia Marina.** [Results of Compulsory Antityphoid Vaccination in the Royal Navy.]—*Ann. Med. Nav. e Colon.* 1916. Nov.-Dec. Vol 2. Year 22. No. 5–6. pp. 579–586.

The author begins with a review of hygienic and other conditions connected with the development and progress of enteric fever in Italy. He gives statistics showing the mortality in the Army and Navy from 1891 to 1908. On page 583 is found a Table containing the number of cases of typhoid fever and paratyphoid fevers treated in the Naval Hospitals of seven Italian ports from February 1st, 1915 to the end of July 1916. With the introduction of anti-typhoid vaccine followed

by the use of a triple anti-enteric vaccine a marked reduction in death-rate became noticeable and is shown in the following table :—

	Year.	Forces Number.	Cases of Typhoid.	Morbidity per 1,000 of strength.
Before vaccination ..	1907	28,304	128	4·52
	1908	29,415	146	4·96
	1909	31,117	97	3·11
	1910	31,661	118	3·72
After vaccination ..	1915–1916 12 months	70,000	64	0·91

Dr. Rho, as a naval surgeon, has watched the improvement and reports that "notwithstanding that the vaccination was not at once completed for all the strength, notwithstanding that in the early months a weak vaccine was used, a considerable reduction of mortality occurred."

J. H. T. W.

Lande (Pierre). **Vaccination contre les infections typhoïdes et paratyphoïdes et paludisme.**—*Caducée.* 1916. Dec. 15. Vol. 16. No. 13. p. 169.

Although recent malaria is recognised as a contra-indication, and antecedent malaria as necessitating special precautions, in the use of army antityphoid vaccine, the instructions for using antiparatyphoid vaccines contain no warnings on these points. The author therefore draws attention to two cases in which abnormal febrile re-action following inoculation with the triple vaccine elicited a history of long-antecedent malaria. In one of the cases (history of malaria in 1902) the rise of temperature, after one inoculation, was continued for four days and was followed for another eight days by a quotidian evening rise; in the other (history of malaria in 1901) the febrile reaction, after a second inoculation, was of a severe malarial type.

A. Alcock.

Nobécourt (P.) & Peyre (E.). **Sur quelques manifestations de la maladie vaccinale consécutive aux injections antiparatyphiques (AB et TAB).**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1916. Nov. 9. 3 Ser. Vol. 32. No. 29–30. pp. 1755–1762.

"As injections of serum for therapeutic use sometimes cause 'serum disease' so may injections of antityphoid and antiparatyphoid vaccines cause a true 'vaccine disease.'"

In four cases which are described in detail each of the four patients presented different and peculiar symptoms at the beginning of the attack :—

"The first, a few minutes after injection of the vaccine felt weakness in the lower limbs, which refused their office. After a few hours anuria appeared, followed by albuminuria.

"The second had 'fever,' stiff neck, headache and insomnia, vomiting and diarrhoea; later he showed signs of nephritis.

"The third, half an hour after the injection, was seized with 'fever,' stiff neck, colic, vomiting, diarrhoea, then anuria and finally albuminuria."

"The fourth immediately after the injection felt a sensation of choking; he was seized with rigors, 'fever,' diarrhoea, severe pains in the legs. Lumbar puncture disclosed a meningitis. The urine contained albumen.

"All were young, aged from twenty-three to thirty years.

"There was no history of previous illness except for No. 2, who had suffered from severe typhoid fever nine years previously.

"With the exception of the old typhoid patient they had all received, several months earlier, antityphoid inoculation.

"Two had borne, without any untoward symptoms, three injections eight and eleven months earlier; one had received, seven months previously, one injection followed by a very brief reaction.

"In the soldier who had only received one antityphoid injection the 'vaccine disease' developed after the first dose of T.A.B. In the others it did not appear until after the second injection, given from eight to twenty-two days later; the first had only provoked a very brief reaction."

"It seems, then that the organism had been sensitized by a previous injection of the vaccine."

Erythema was observed.

J. H. T. W.

DIENERT (F.) & MATHIEU (G.). **Recherche des bacilles typhiques et paratyphiques dans les selles et les eaux.**—*C. R. Acad. Sci.* 1917. Jan. 8. Vol. 164. No. 2. pp. 124–126.

The authors refer to LOEFFLER'S discovery that malachite green favours the growth of Enterica bacilli while it checks the growth of *B. coli communis*; they think that the varying results obtained by other workers have been due to the varying quality of the malachite green sold by different chemists and they give preference to Grübler's "powder malachite green." The standard of quality is fixed as follows:—

"As a preliminary measure one must test this colouring matter by sowing *B. paratyphosus* B in peptone water containing $\frac{1}{30000}$ malachite green. The 'green' is of suitable quality when this bacillus develops and decolorizes the medium within 24 hours."

It is found that *B. coli* cannot flourish, as a rule, in a medium containing $\frac{1}{80000}$ of malachite green.

"Eberth's bacillus multiplies rapidly in solutions much richer in malachite green ($\frac{1}{50000}$ to $\frac{1}{20000}$) except in the case of old strains growing for a long period in the laboratory; these seem to be affected by the same strength as that which affects *B. coli*.

"*B. paratyphosus* A develops better than Eberth's bacillus; as to *B. paratyphosus* B it would seem that malachite green constitutes a medium of election for this bacillus."

Plate cultures should be made from the growths in peptone water.

"In 24 hours peptone water containing $\frac{1}{25000}$ of malachite green is entirely decolorized by paratyphoid B." [cf. TIDY and DUNN, this *Bulletin*, Vol. 9, p. 19.]

J. H. T. W.

COLE (Sydney W.) & ONSLOW (H.). **On a Rapid Method for the Cultural Differentiation of the Typhoid and Paratyphoid Bacilli A and B. Report to the Medical Research Committee.**—*Lancet.* 1916. Dec. 16. pp. 1011–1013.

Method of Differentiation.—"We do not propose here to provide a complete scheme for the identification of T., A., and B., but merely a rapid

cultural method of differentiating these from one another. Two solutions are employed, a glucose solution ('G') and a dulcite solution ('D.') The former is used for differentiating B from T and A, since at the end of 24 hours B is alkaline while the others are acid. The solution 'D' differentiates A from T since at the end of 24 hours A is acid and T alkaline." The method is based on the Hydrogen-ion concentration described by the authors

Glucose Solution "G."

"Tryptic broth"	1,000 cc.
Phenol-sulphone-phthalein (0·04 per cent.). .	40 cc.
Glucose	2 gm.

"Tube in 3 cc. portions and sterilize by steaming for 20 minutes on three successive days. We employ tubes of $\frac{5}{8}$ in. diameter. . . . With a decrease of diameter the rate of alkali production is retarded, with an increase it is accelerated. This is due to the effect of the diameter of the tube on the surface area, and therefore on the supply of oxygen.

"Dulcite Solution 'D.'"

T/6	1,000 cc.
Phenol-sulphone-phthalein (0·04 per cent)...	40 cc.
Dulcite	2 gm.

"The diluted 'tryptic broth' (T/6) must be accurately adjusted to PH = 7·35 [see *Lancet*, 1916, July 1, p. 9] before the addition of the dulcite and Phenol-sulphone-phthalein. Tube in 2 cc. portions in tubes of $\frac{5}{8}$ in. diameter, and sterilize as before. A glass bead is usually added before sterilizing to distinguish these tubes from 'G.' We also have ready tubes containing 0·5 per cent. sucrose and 0·5 per cent. lactose; also fermentation tubes containing 1 per cent. glucose. These sugars are dissolved in T/6 and phenol-sulphone-phthalein is added in the proportion mentioned above."

"After plates have been grown from faeces or other material . . colonies are emulsified into a tube of glucose broth. This tube is incubated for two hours. Two loops of this are then sown into a tube of 'G' and 'D,' as well as the other sugars employed. These tubes are then incubated for exactly 24 hours at 37° C." The reactions are:—

	Solution "G."	Solution "D."	Glucose fermentation tube.
B. typhosus	Yellow	Red or pink	Acid.
B. paratyphosus A ..	Yellow	Yellow	Acid and gas.
B. paratyphosus B ..	Red or pink	(Variable)	Acid and gas.

J. H. T. W.

i. Svestka (V.). **Ein Differentialnährboden für den Typhus-, Paraty- "A-" und "B-" Bazillus.**—*Münch. Med. Woch.* 1917. Mar. 13. Vol. 64. No. 11. p. 374.

ii. Sobel (Lucius Leo). **Kombinierter Differentialnährboden für Typhus, Paratyphus A und B.**—*Ibid.* Feb. 13. No. 7. pp. 210–211.

iii. Lehmann (Ernst). **Ueber das Vordringen des Paratyphus A.**—*Ibid.* Jan. 9. No. 2. pp. 57–58.

iv. Kulka (Wilhelm). **Ein einfacher Differentialnährboden für die Typhus-Paratyphusgruppe.**—*Ibid.* Jan. 2. No. 1. pp. 32–33.

As all these contributions to knowledge except No. iii deal with the cultivation of Enterica bacilli and their growth on certain "nutrient media," they can be dealt with together.

i and iv :— Dr. Svestka and Dr. Kulka both use and recommend glucose agar + galactose + 6 drops 10 per cent. alcoholic solution of fuchsin (to each tube) :—

B. typhosus :—Rose-colour (Svestka) ; wine-red, later yellowish (Kulka) ; no gas formed (S. K.).

B. paratyphosus A :—Colourless to light-rose (S.) ; wine-red (K.) ; gas formation slight but noticeable (S. K.).

B. paratyphosus B :—Intense fuchsin-red (S.) ; purple-red, then yellowish or almost colourless (K.) ; marked gas formation, noticeable fermentation (S.) ; gas-formation strong (K.).

ii. The author uses the following medium :—

Neutral Nutrient agar ..	1 litre	The colour of the medium in tubes sterilized and ready for use is violet.
Grape sugar	10 gm.	
Litmus-Whey	400 cc.	
Litmus	30 cc.	

With this " combined nutrient medium " he obtains the following results :—

B. typhosus.—No gas ; deep red colour ; no blue-violet tint round upper margin ; no whitish film.

B. paratyphosus A. –Gas present ; deep red, no marginal tint ; no film.

B. paratyphosus B.—Gas formation very marked ; red-yellow to straw-yellow ; blue-violet marginal tint ; no film (such as is obtained with *B. faecalis alkaligenes* and sometimes with *B. proteus* grown in Sobel's medium) [cf. LEBOEUF, this *Bulletin*, Vol. 8, p. 106].

iii. The author gives a detailed account of the gradual spreading of paratyphoid A fever. Movement of troops brought the disease from the East and led to its advance westward in several directions.

J. H. T. W.

PAGNIEZ (Ph.) & PASTEUR VALLERY-RADOT. **Culture des bacilles typhiques et paratyphiques sur sérum humain.**—*C. R. Soc. Biol.* 1917. Feb. 17. Vol. 80. No. 4. pp. 185–186.

The results of this work are, briefly :—

" 1. *On human serum, normal and coagulated,* the typhoid bacilli and the paratyphoid bacilli grow quite as well as on coagulated serum of animals and as successful sub-cultures can be made, the water of condensation in the culture tube contains an emulsion of bacilli."

" *On coagulated serum from persons vaccinated against typhoid fever or from persons suffering from, or convalescent after, typhoid or paratyphoid fever,* the bacilli (both kinds) grow as easily as upon serum of normal persons."

" 2. If in place of coagulated human serum one uses fluid serum simply heated to 56° C., and even to 48° C., the results are the same."

" 3. In serum which is not heated the results are irregular, and unreliable."

The authors regret that they were not able to test the growth on fluid serum from " paratyphoids," but with fluid serum from " typhoids " the results were the same.

J. H. T. W.

Veiga (Octavio). **Contribuição ao estudo da febre Typhoide.** [A Contribution to the Study of Typhoid Fever.]—*Ann. Paulist. Med. e Cirurg.* 1916. Sept. Vol. 7. Year 4. No. 3. pp. 54–58.

The author describes a method for detecting the typhoid bacillus upon vegetables and fruits, such as lettuces and strawberries, which have been watered with contaminated water or liquid manure.

The lettuces or strawberries, as the case may be, are placed in a sterilized funnel over a sterilized flask, and a litre of sterilized water is poured over them. The wash-water is centrifuged for 15 minutes in order to remove foreign matters, and the decanted fluid is then inoculated on to Petri dishes of Drigalski-Conradi medium. After an incubation period of 24 hours, the isolated colonies are subcultured upon a sufficient number of agar slopes and numbered. The mobility or non-mobility of the bacteria is then ascertained microscopically, and the immobile forms are discarded, while the growths of mobile bacilli are reserved for further testing with agglutinating sera. Proceeding in this way, the author was able to isolate in one out of 52 subcultures, from the washings of a lettuce, a bacillus which agglutinated with a standard laboratory typhoid serum in dilutions up to 1 : 500, while from the other 51 tubes bacilli were obtained which only agglutinated up to 1 : 50 or 1 : 100. The other re-actions of the bacilli were studied at the same time.

The author recommends the method as a serviceable one.

J. B. Nias.

Caronia (G.). **Nuovi metodi di vaccinoterapia antitifica ed antiparatifica.** [New Methods of Vaccine Treatment for Typhoid and Paratyphoid Fevers.]—*Pediatria.* 1917. Jan. Vol. 25. No. 1. pp. 1–37. With 38 charts.

Dr. Caronia first considers the vaccines already in use either for prophylaxis or treatment in enteric infections.

"1. Vaccines prepared with living bacilli, attenuated by physico-chemical or by biological methods (vaccines of Castellani, Nicolle, Conor and Conseil, also the sensitized vaccine No. 1 of Besredka).

"2. Vaccines prepared with bacilli killed by heat or by chemical agents (vaccines of Wright, Leishman, Pfeiffer-Kolle, Russel, Besredka No. 2, Vincent and the mixed vaccine of Castellani).

"3. Vaccines containing the products of the bodies of bacilli obtained by the action of chemical, physical or biological agencies (vaccine of Wassermann, Vincent No. 2, Sclavo, Noguchi, and Di Cristina)."

The vaccine prepared by Dr. Caronia belongs to the third class and is a modified form of that used by Di Cristina.

Typhoid bacilli grown for 24 hours on agar (also paratyphoid bacilli) are used. The growth is mixed with normal saline solution to which is added fresh and strongly agglutinating "enteric" serum. The emulsion thus obtained is placed in the incubator at 37° C. for about 72 hours; then more "enteric" serum is added, together with ½ per cent. phenol. The vaccine is then centrifuged to separate the bodies of bacilli that have not been destroyed; for three days the vaccine is submitted to a temperature of 55° C. for an hour.

Another "modified" vaccine is described.

Forty-six cases of typhoid fever were treated with these vaccines and temperature charts are given showing the effect of each dose on the disease. Many of these cases were of a serious type. The vaccine treatment certainly seems to have been of value, but there were no "control" cases [cf. a valuable "contribution" by Lt. WHITTINGTON, R.A.M.C., this *Bulletin*, Vol. 9, p. 22].

J. H. T. W.

NOTES.

In a speech delivered in explaining the medical heads of the budget in the Imperial Legislative Council (Delhi, March 10th 1917), published in the "Pioneer," Sir Pardy LUKIS stated:—

"But perhaps the most valuable assistance we have been able to render to His Majesty's Forces overseas has been the conversion of the Central Research Institute, Kasauli, into a huge manufacturing depot for the preparation of vaccines, intended to protect the troops from the ravages of typhoid and para-typhoid fevers as well as from those of cholera. The preparation and despatch of these vaccines, in the large quantities required, have involved an enormous amount of work. The institute, in response to military demands, has already issued half a million cc. of typhoid and para-typhoid vaccines and three-fourths of a million cc. of cholera vaccine and arrangements are now in progress to increase largely the output in the immediate future. In connection with the supply of vaccines from Kasauli, I should like to mention that, at the end of last month, the Central Research Institute was visited by two members of the Medical Advisory Committee, sent out to Mesopotamia by the War Office, and that they have reported as follows:—

"We were shown the various steps in the preparation of these prophylactic vaccines from the start to the finished product, and we were greatly impressed by the care taken to ensure the purity of the various constituents of the vaccines at every step in the process, their accurate standardisation and their final incorporation as a carefully tested sterile product in sealed glass vials. The general arrangement of the laboratories and equipment left nothing to be desired."

This, I think, reflects great credit upon Majors Brown and Cunningham of the Bacteriological Department to whom were entrusted these difficult and delicate duties."

J. H. T. W.

On March 1st in the House of Commons, Mr. FORSTER, Financial Secretary to the War Office, spoke of the disappearance of enteric fevers as "remarkable." Army "returns" showed that during the previous week there were:—In France, 4 cases; in Salonika, 9; in Egypt, 3; in Mesopotamia, 8; total, 24 cases of typhoid fever.

Up to November 1st, 1916 there had been among British troops in France:—1,684 cases of typhoid fever; 2,534 cases of paratyphoid fever; 353 of indefinite type; total, 4,571. During the South African War about 60,000 patients were admitted into hospital suffering from typhoid fever; 8,227 died. Referring to the value of anti-typhoid and anti-paratyphoid inoculation it has been recorded that the incidence has been fifteen times greater among the uninoculated than among the inoculated.

J. H. T. W.

PLAGUE.

CADET (G.). **La Peste du Sud-Annam.**—*Bull. Soc. Path. Exot.* 1917. Jan, Vol. 10. No. 1. pp. 41–65. With 1 map & 1 chart.

It is difficult to assign a precise date to the commencement of plague in South Annam. The disease appears to have been endemic since 1907 and has spread northward along the coast from year to year since that date. Phan-Thiêt was first involved in 1908, probably by means of an infected junk from Saigon. 10 doubtful cases occurred at Quang-The in 1909 and fresh extensions took place in 1910 and 1911 to Binh-Uhon and Phu-Hai respectively. At the latter place 2,500 victims were claimed. Plague became wide-spread during the succeeding years and in 1915, 109 cases occurred at Phan-Thiêt, 63 at Phan-Ri and 115 at Phan Rang, making a total of 287 for the year. In almost all cases murine epizootics were observed before and during the recrudescence of the epidemics.

Three species of rats are met with in South Annam. The first is described as the "small house-rat" (con chuôt lac of the natives) and is stated to be by far the commonest. It is a little larger than the European mouse, its total length being about 25 cm. and its average weight being about 35 grams. The tail, which is as long or longer than the body, is cylindrical and tapering. The ears, which are grey and transparent, are a little longer than half the head. The female has four pairs of mammae, two at the level of the anterior limbs, and two posteriorly, one at the level of the coxo-femoral articulation and one behind. The fur is dark grey, with some tawny hairs, above, and whitish grey below. This little animal is very active, is widely spread and nests in the bamboos of which the native houses are constructed. It is very susceptible to plague infection, and is probably a new species. The second rat mentioned is without doubt *Mus decumanus* (con chuôt công) and needs no further description. The third species is described as the "rice-field rat" (con chuôt dông). The length is intermediate between the "small house-rat" and *M. decumanus*, the tail is conical and shorter than the body. There are six pairs of mammae, three thoracic and three abdominal; the fur on the back is light grey and the belly fur almost white. This rat, which is considered comestible by the natives, is found throughout the rice-fields and is never known to nest in the houses. The musk-rat (con chuôt xa) is also found—the species being most probably *Crocidura murina*.

The parasites on 8,312 house-rats, 297 *M. decumanus* and 297 musk-rats, were examined between April, 1915, and March, 1916. The parasitism of the house-rat was not very intense but was of remarkable consistence, averaging from 1 to 2 fleas per rat throughout the year. The average number of fleas found on *M. decumanus* varied from 24 in April to 4 in August, rising again to 12 in October and January. The flea curve for the musk-rats followed that of *M. decumanus* very closely, the greatest number being 18 in May and the smallest about 3·5 in August. The height of the flea curve corresponded closely with the height of the epidemic period. With regard to species of fleas, which were indifferently distributed on all the rodents in question, 95 per cent. were found to be *Xenopsylla*

cheopis. Of 276 fleas examined and identified, 157 proved to be female *cheopis*, 117 male *cheopis* and two male *Pulex irritans*. *Ceratophyllus* was never demonstrated. The climate of South Annam is very uniform, the mean daily temperature fluctuating between 24° and 31° C. and constitutes ideal biological conditions for the development of *X. cheopis*. "There exists then on the one hand, an abundant murine population heavily endowed with parasites for the insect transmission of (plague) virus; on the other hand, dense human agglomerations (fishing villages), very dirty and completely indifferent to contagion."

R. St. John Brooks.

OTTEN (L.). **De rol van de veldrat in de epidemiologie der pest.** [The Role of the Field-rat in the Epidemiology of Plague.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 6. pp. 789–862.

Five species of the genus *Mus* are met with in Java. Two of these are sub-species of *Mus rattus*, viz., *Mus rattus griseiventer* (Bonhote), the common house-rat and *Mus rattus diardii* (Jentink), the field-rat; the remaining species being *Mus concolor* (Blyth), the small house-rat, *Mus jerdoni* (Blyth), the "klapperrat" and *Mus musculus*, the mouse.

At all times of the year the field-rat maintains contact with the house-rat in the houses, such contact being especially great during the flooding of the fields during the West monsoon and particularly in that period of the East monsoon during which the land is lying fallow. During the harvest time, however, the normal proportion between the two species is restored. In consequence of the intensive contact of the house- and the field-rats in the villages during the last month of the East monsoon, the field-rats on their return to the open country carry back with them the house-rat flea—*Xenopsylla cheopis*. With the setting in of the rainy season the numbers of this flea fall in comparison with those of *Pygiopsylla ahalae*, the proper parasite of the field-rat, which occurs during the whole year in the fields. Although the occurrence of plague among the field-rats, both in villages and on the land has been established, it does not appear that they are responsible for the foci of metastatic plague which cause the spread of the disease from village to village in Java. In the first place although this species migrates to the villages at certain times of the year, it lives essentially and nests in the rice-fields and establishes but small contact with man. The following Table of rats trapped in the houses from seven Javanese districts bears out this point:—

District.	Total number.	House-rats (both species).	Field-rats.	Percentage Field-rats.
Pakis	2,013	1,920	93	4·6
Gondang legi ..	1,969	1,903	66	3·3
Ngantang ..	1,519	1,515	4	0·26
Senggoeroeh ..	303	302	1	0·33
Karanglo ..	499	499	—	0
Kota Malang ..	187	186	1	0·53
Toeren	3,801	3,518	283	7·54

The flea infestation of the field-rat is, moreover, very low, seldom rising above one flea per rat and generally being considerably lower. In the case of field rats found in the houses during April–December, 1912, 79 *cheopis* were caught on 260 field-rats, giving an index of 0·3, and 178 *P. ahalae* with an index of 0·68 per rat. There is also no particular evidence of mortality among the field rats during periods of epidemic plague.

In seeking for a solution to the problem of the rural spread of plague in Java the signification of the human carrier (in the widest meaning of the word) must not be overlooked. The rôle of the house-rat in such dissemination must be viewed very doubtfully in this connection, as these animals are only found in the fields on rare occasions.

R. St. J. B.

Rees (D. C.) & Targett-Adams (P.). **The Transmission of Plague by Human Carriers.**—*S. African Med. Rec.* 1916. Oct. 28. Vol. 14. No. 20. pp. 315–317.

Seller (A. E.). **Carriers of Bubonic Plague.**—*S. African Med. Rec.* 1917. Feb. 10. Vol. 15. No. 3. pp. 35–37.

The recent plague outbreaks which have occurred in the Eastern Districts of the Cape Provinces and in the Orange Free State have exhibited features of epidemiological interest with regard to mode of spread, degree of virulence, apparent absence of rodent epizootic, strictly rural distribution and the occurrence of groups of cases of pestis minor. The original source of infection has not been definitely traced, but the initial infection was probably derived from the coast and conveyed inland by means of goods imported from India or Mauritius. The disease was then disseminated by infected rodents or goods.

In July, 1914, an outbreak occurred in the Queenstown district of the Cape Provinces and was exclusively of the pneumonic type. The disease reappeared in the same locality in 1915 (but this time in its bubonic form) as well as later in the Orange Free State in 1916. The extension of the disease to the Orange Free State is attributed to the migratory habits of the native population. In these outbreaks no evidence of rodent epizootic plague could be obtained and Rees and Targett-Adams feel compelled to fall back upon the conception of a direct man to man transmission of bubonic plague. The high degree of infectivity met with in these epidemics is attributed to (a) environment and (b) race, associated with an unusually virulent strain of the micro-organism. The condition in which the native population exists is stated to be not very dissimilar to that in which rodents live in their burrows, the huts being dark and dirty, unventilated and overcrowded, and having a cow-dung or earthen floor.

The saliva obtained from the Orange Free State bubonic cases on the fourth day of illness was found to contain plague bacilli, and indeed organisms, which were presumed to be *B. pestis* of low virulence, were obtained from the expectorations of convalescent patients who had contracted the disease from one to three months

previously. This observation suggested the possibility that immune carriers may be, as in diphtheria and typhoid fever, sources of infection.

Major Seller, in criticising the conclusions arrived at by Drs. Rees and Targett-Adams, does not consider that the absence of a rodent epizootic has been satisfactorily demonstrated by them [no particulars are given which would assist one in forming any opinion on this subject], but he is at one with them in so far that he cannot agree with the conclusion of Martin and others "that the patient is a negligible source of danger to his surroundings provided he does not develop a secondary pneumonia." [The whole position seems very obscure and wants clearing up. In the absence of data with regard to rodent examination, virulence, degree of septicaemia, clinical case history and so forth, the observations recorded lose much of their value.]

R. St. J. B.

Wright (William). **The Control of Rat Plague.**—*Jl. State Med.* 1916. Dec. **Vol. 24. No. 12. pp. 380–384.**

A case of ship-borne plague of obscure etiology is here cited, which presents several points of interest. The vessel in question left Bombay on the 8th April, 1911, and after touching at Port Said and Marseilles reached the Clyde on 13th May, and on 16th May was transferred to the Graving Dock, Govan, on the south side of the river. The last presumable date of infection was on the 8th April, as the vessel did not lie alongside the quay at the other ports mentioned. A case of human plague occurred on board on May 28th, that is to say 50 days after the vessel left Bombay. All the rats found after disinfection were ascertained to be free from plague infection.

The author suggests that the solution of the question of mode of infection may be found by seeking some other channel of contagion as yet unrecognised and quotes the following statement by Verjbitski in this connection:—"In the case of linen and other fabrics soiled by crushing infected fleas and bugs on them, or by the faeces of these insects, the plague microbes can, under favourable conditions, remain active and virulent during more than five months."

R. St. J. B.

Public Health Reports. 1916. Oct. 13. Vol. 31. No. 41. pp. 2815–2816.—**Plague, a Disease of Rodents.**

The fact that plague infection may be present in rats without making its appearance in man, is emphasized by the case here brought to notice. The steamship "City of Durham" arrived at Hong Kong without cargo from Shanghai in August, 1916, and two plague infected rats were found upon examination. The captain stated that no case of human plague had occurred on board and the crew of 66 men were examined and found to be free from plague infection.

R. St. J. B.

Flu (P. C.). **Verdere onderzoekingen over de vraag of muskieten als overbrengers van pest kunnen optreden.** [Further Investigations on the Question of Mosquitoes as Carriers of Plague.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 6. pp. 917–921.

The author has previously demonstrated that plague bacilli can multiply in the stomach of the mosquito (Mansonia and Culex) and that material obtained from the stomach or fore-gut, on inoculation into healthy marmots, could convey plague infection to them [see this *Bulletin*, Vol. 5, p. 394]. Transmission of infection by biting was not, however, demonstrated, as the season of the year was unfavourable for the activities of Anopheles and Stegomyia. The present paper deals with a series of experiments conducted with infected *Anopheles rossi* and *Stegomyia fasciata* (*vel calopus*) which were induced to bite experimental guineapigs. In one experiment 64 imagines of *Anopheles rossi*, which had previously fed on a guinea-pig suffering from plague septicaemia, were placed in fresh cages. Two days later 54 of these were induced to bite a healthy guinea-pig, with a negative result. After another interval of two days 28 of the surviving mosquitoes sucked the blood of a second healthy guinea-pig; this animal also remained free from plague infection.

The next day a third guinea-pig was inoculated with the crushings of 24 of the mosquitoes which had survived. This guinea-pig died subsequently from typical plague. It appeared to be not unlikely that these negative results might be due to low virulence of the strain of plague bacilli used in the experiment, and in order to eliminate this possible source of failure a very virulent strain of pest organisms was employed in the remaining series of experiments. One-hundred-thousandeth of a loop of this strain, on subcutaneous inoculation, killed a guinea-pig in three days. *Stegomyia fasciata* (*vel calopus*) was employed in this portion of the research. The results of similar experimentation to the foregoing were uniformly negative with regard to the feeding technique, although the crushed bodies of the mosquitoes were capable on subcutaneous inoculation of infecting healthy guinea-pigs. So far as these experiments go, it would appear that under natural conditions, mosquitoes do not act as porters of plague infection.

R. St. J. B.

Eberson (Frederick) & Wu Lien Teh. **Transmission of Pneumonic and Septicemic Plague among Marmots.**—*Jl. Infect. Dis.* 1917. Feb. Vol. 20. No. 2. pp. 170–179.

During the Manchurian epidemic of pneumonic plague in the winter of 1910–1911 a suspicion arose that the tarbagan, *Arctomys bobac*, played a part in its transmission, but no experimental evidence was adduced to show this animal was in any way associated with the disease. Strong showed, however, in 1912, in a general way that tarbagans could be infected with pneumonic plague if the organisms were sprayed in droplet form. The experiments here reported were designed to elucidate this point and to determine the rôle played by the marmot in the spread of infection through contact and feeding on the bodies of animals which had died from plague.

The animals used were of a closely allied species to the tarbagan, known as *Spermophilus citillus.*

The method of inoculation employed conformed as far as possible with the natural mode of infection in pneumonic plague. A 24-hour agar slope of *B. pestis* was suspended in 10 cc. of salt solution and sprayed from a graduated cylinder fitted with a very fine nozzle, the spray being directed towards, but not into, the nasal passages of the animal. Before spraying, the animals were covered with a wide piece of absorbent cotton soaked in cresol, to prevent droplets lodging in the fur, and after inoculation the head of each marmot was carefully wiped to remove extraneous organisms. In order to minimise the danger from droplet infection, a specially constructed box was used while the animal was being inoculated. The following experiment is typical of the results obtained. Two marmots were inoculated and two contacts were placed in the same cage after two days. Contact 1 died after four days, and contact 2 after six days with numerous *B. pestis* in the lungs and spleen. The lungs were inflamed throughout and congested; visceral congestion was pronounced and the trachea and bronchi were inflamed. One of the inoculated marmots died after five days from pneumonic plague; the other escaped infection.

It is thus shown in a conclusive manner that plague infected marmots can readily transmit plague through the breath, as is the case among human beings, and conditions which favour the propagation of the disease among the latter are in no respects different for these animals. Of 7 marmots inoculated by inhalation, 5 died a ter from 4 to 6 days with acute pneumonic plague and septicaemia —a percentage of 71. Nine contacts placed with infected marmots after periods varying from 1 to 4 days, showed a plague mortality of 77 per cent. There is thus a remarkably short incubation period, with marked early infectivity on the part of the inoculated animals. Plague may also exist in chronic form among marmots; they can live for 9 to 12 days with pronounced plague and be capable of conveying infection to other animals. This is a fact of the utmost importance from an epidemiological standpoint. Subcutaneous inoculation of marmots with varying doses of plague caused the death of the animals with acute septicaemic plague with slight, if any, signs of bubonic infection; showing that these animals are extremely susceptible to infection. Infection may also take place by feeding. Three marmots fed with lung, liver and spleen from an animal that had died of acute plague, succumbed to infection on the fourth day. Intense inflammation of the gastric mucosa occurred.

R. St. J. B.

Eberson (Frederick). **Plague Poisons and Virulence.**—*Jl. Infect. Dis.* 1917. Feb. Vol. 20. No. 2. pp. 180–184.

Friedberger has pointed out that powerful poisons could be produced if complement, as present in normal guinea-pig serum, is allowed to act on suspensions of bacteria. These "anaphylatoxins" give acute shock on injection and cause the death of the experimental animal. Zinsser has recently shown that animals may acquire distinct tolerance of such poisons and survive large doses of the "proteotoxins," provided the initial dose is sufficiently small. An

attempt has been made here to immunize animals with such proteotoxins obtained from the plague bacillus. Contrary to the results obtained with other organisms it was found to be impossible to develop a toxin which would give the slightest shock when injected intravenously, but, curiously enough, all the animals so treated died of acute plague after several days. The culture used in the experiments was an avirulent Shanghai strain of *B. pestis* that had been growing on artificial media in the laboratory for eighteen months, and as the lethal result could be obtained by employing very small numbers of bacilli not in themselves virulent, the deduction must be that contact with the serum had enhanced the virulence of the organisms. [See also ROWLAND's experiments with horse serum strains of plague, this *Bulletin*, Vol. 5, p. 398.] The following table gives a good idea of the kind of result obtained :—

Guinea-pig.	Weight.	Dose.	Incubation.	Result.
1.	342 gm.	0·2 cc.	5 hr.	Died within 30 hours of acute plague. All organs and blood contained enormous numbers of bacilli.
2.	305 gm.	0·2 cc.	22 hr.	Died after 28 hours. Same findings as in No. 1.
3.	510 gm.	0·1 cc.	5½ hr.	Died after 44 hours. Acute plague. P.M. findings same as No. 1.
4.	576 gm.	0·1 cc.	5½ hr.	Died after 72 hours. Same as preceding.
Controls.				
1.	344 gm.	0·1 cc.	—	Lived. Well.
2.	250 gm.	0·1 cc.	—	,, ,,
3.	348 gm.	0·2 cc.	—	,, ,,
4.	372 gm.	0·2 cc.	—	,, ,,
5.	380 gm.	0·3 cc.	—	Died after 5 days.
6.	305 gm.	0·4 cc.	—	Died after 3 days.

R. St. J. B.

VAN ANDEL (M. A.). **Plague Regulations in the Netherlands.**—*Janus.* 1916. Nov.–Dec. Year 21. pp. 410–444. With 2 plates.

A very full account is here given of the various methods of plague combat and prophylaxis employed in the Netherlands during the Middle Ages. Generally speaking the methods employed, being merely empirical, did not lead to very successful results, but the regulations for ventilation and fumigation of houses, and disinfection and washing of infected objects were undoubtedly steps in the right direction.

Some of the plague regulations appear to have been very quaint and interesting. In order that suspected persons should be quickly recognized every inhabitant of an infected house had to carry with him a white stick of one and a half yards long without concealing it under his cloak or gown, while the attendants on the sick (Utrecht, 1646) were obliged to mark themselves in a special manner, namely by a white and red cord around their cap.

It was generally believed that cats, dogs and other domestic animals could play a part in the propagation of the infection, the supposition being that these animals "attract the venom into their fleece and bring it in that way from one house to another." At Gorenchem in 1502 it was prohibited to let any dog go in the streets on a penalty of ten pennies, and in 1636 officials were appointed to destroy all dogs found in the streets. Pigs were also looked upon with grave suspicion and the Leyden magistrate issued an order in 1567 "forbidding to pasture any pig on the streets, churchyards or places in the city, considering that these animals are peculiarly disposed to corruption and infection and that the citizens in these fatal times should be protected against this danger." Amongst fumigating agents, juniper berries, rosemary, sage, lavender and valerian appear to have been in high favour.

R. St. J. B.

Elders (C.). **Over besmetting van de urinewegen met een pseudopest-bacil bij den mensch.** [Urinary Infection with a Pseudo-Pest Bacillus.]—*Nederl. Tijdschr. v. Geneeskunde.* 1916. No. 16. pp. 1391–1396.

A case is here reported of the isolation in pure culture of a member of the Pasteurella group of bacteria from the urine of a female patient suffering from pyelocystitis of long standing. The specimens of urine subjected to examination were somewhat turbid, free from renal casts, contained a trace of albumen, a few leucocytes, and bacteria arranged in clumps. An autogenous vaccine was prepared from these bacteria and was administered to the patient. It caused considerable local reaction and was soon discontinued on account of her extreme nervousness.

Cultures of the organism made on agar plates revealed the presence of smooth lense-shaped colonies with regular edges. The colonies were greyish white and were at first quite transparent. They were shiny, viscous and were capable of being drawn out in threads when touched with the platinum needle. Microscopically the organisms appeared as bi-polar bacilli, Gram negative and non-motile. They measured 2–3μ in length and were some ·75μ in breadth. Growth occurred at room temperature on Loeffler's medium, gelatine and agar; the organisms from the first mentioned medium being shorter and coccoid in form. Gelatine was not liquified. Milk was clotted in four days at 37° C. and turbidity with sedimentation and film formation was observed in urine media. In peptone water indol production was demonstrable on the seventh day. The growth on potato was scanty but the bacilli which grew formed long threads some 10μ in length. Rothberger's neutral agar was not reduced and gas formation was not observed. Acid, but not gas, was produced in the monosaccharides, glucose, laevulose and galactose. Lactose was fermented slowly, but no change occurred in maltose and saccharose, nor was haemolysis present in blood agar. The virus was pathogenic to rabbits, but small doses produced anti-sera of high titre; a dilution of 1–10,000 being sufficient to agglutinate the organism.

R. St. J. B.

UNCLASSED FEVERS OF TROPICS AND DENGUE.

HARNETT (W. L.). **Sandfly Fever and Dengue.**—*Indian Med. Gaz.*, 1916. Dec. Vol. 51. No. 12. pp. 444–452. With 33 charts.

In parts of India and the middle East where dengue and sandfly fever are very prevalent, difficulty in diagnosis has frequently occurred, sandfly fever often being termed three day fever, and dengue seven day fever. Long attacks of the one and short febrile periods in the other give rise to intermediate forms, and the saddle-back curve or secondary rise is not confined to one alone. In this paper a number of temperature charts are given to illustrate these forms.

In 1913 the author published a short paper on the changes in differential blood counts made at various periods in cases of dengue [see this *Bulletin*, Vol. 2, p. 31]. These observations were confirmed recently by a further series; they showed an early leucopenia with rapid diminution of the polynuclears, an increase in the number of lymphocytes and a rise in the eosinophiles. A combined chart of 50 cases shows the polynuclear and lymphocyte curves crossing about the sixth day. BALFOUR had previously noted that the eosinophiles were increased during convalescence; this increase was practically always present in the author's cases (up to 10 per cent.), and was not dependant on intestinal parasites, at least no ova were found. From his extended observations and the experience of others the author is unable to fix on any points of differentiation between the two diseases, whereas the similarities of the pyrexial curves of many cases in epidemics of each of the fevers, with the identical characters brought out by blood examination and relative white cell counts, cause him to conclude "*that they are not two closely related fevers, but one and the same fever, modified by circumstances as yet unknown.*" He suggests that sandfly fever is the ordinary endemic type with a percentage (15–20) of severer forms; and that when occurring in epidemics the disease would be in half the cases of the more severe form, lasting five or six days and accompanied by a terminal rash, viz., dengue.

Whether an acquired immunity for sandfly fever will protect a person from dengue in the presence of a severe epidemic has not been worked out and observations on these lines would be interesting. Etiologically both diseases are due to filterable viruses, the one spread by mosquitoes, the other by phlebotomi, but the infective periods are different. It is possible that more than one kind of vector may be able to convey these diseases.

[Though the author has not proved his contention, the work is evidence of much patient investigation and is of great interest to all who have to deal with these very frequent fevers. It is still debateable whether or not the term dengue should be applied to the endemic seven day fever of India.]

P. W. Bassett-Smith.

GOLDSMID (J. Albert). **Fatal Haemorrhagic Dengue.**—*Med. Jl. of Australia.* 1917. Jan. 6. Vol. 1. 4th Year. No. 1. pp. 7–8. With 1 chart.

The author in a previous paper on the epidemic dengue of New South Wales noted that complications were very rare. In this

communication he records three cases with severe purpuric complications and states that jaundice of a moderately severe type is not uncommon. Two out of the three cases were in young children, three and five years old, and the younger died. The third case was in a farm labourer. He had an ordinary attack of dengue and returned to duty after six days, when a general purpuric rash over limbs and trunk appeared and his gums began to bleed ; the urine was also bloody. The temperature became sub-normal, the pulse slow, and hæmorrhages from mucous membrane followed. The patient died nine days after the onset of the dengue attack and three days after the first appearance of the spots. The man had two or three years previously suffered from malaria but had never passed blood in the urine and no history of haemophilia could be obtained.

The author draws attention to this complication " in view of the contention that dengue is supposed to be an attenuated form of yellow fever and that both diseases are transmitted by *Stegomyia fasciata*."

P. W. B-S.

Yamaguchi (K.), Ditsumi (D.), & Tonomura (K.). [**Dengue, Experimental Study of.**]—*Saikin Gaku Zasshi.* 1916. Apr. 20. No. 247. pp. 657–658. [Abstract based upon Review by R. G. Mills in *China Med. Jl.* 1916. Nov. Vol. 30. No. 6. p. 460.]

Animal inoculations into guinea pigs, dogs, rats, and monkeys were without results, but injected into man the blood from a fever patient was found to be infectious when taken on the first to the seventh day after the paroxysm. A dose as small as 0·05 cc. was able to transmit the infection and it retained this power after being kept in the incubator for six hours. Mosquitoes [kind not stated] were allowed to bite the patients and were then dissected ; the salivary glands and digestive tracts were injected but no infection followed.

P. W. B-S.

Enoue (R.). [**Dengue, Immunity in.**] *Taiwan Igakukai Zassi.* 1916. June 28. No. 163–164. pp. 389–390. [Abstract based upon Review by R. G. Mills in *China Med. Jl.*, 1917. Vol. 31. No. 1. pp. 76.]

The author noticed that during an epidemic of dengue in Tainan (Formosa), 196 cases were among the Japanese and that 14, or 7 per cent. died, only five natives being affected. As in previous years the disease had been prevalent, the natives had probably acquired an immunity. Children breast fed were more resistent than those reared on cows' milk, possibly from a transmitted immunity but one attack did not give any permanent protection.

P. W. B-S.

Armand-Delille. **Note sur les principaux caractères de la Dengue méditerranéene, observée aux Dardanelles et en Macédoine.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Oct. 26. 3 Ser. Vol. 32. No. 27–28. pp. 1709–1714. With 1 chart.

With Sarrailhé in 1915 the author observed epidemics of a three day fever in the Dardanelles at Sedul Bahr. In 1916, in the

neighbourhood of Salonika, he had the opportunity of seeing a great number of cases. The fever appears with the hot weather and coincides definitely with the appearance of the Phlebotomus flies. The incubation is short, about three days, the onset abrupt with congestion of face and eyes, headache and malaise, but rarely with vomiting. It bears a close resemblance to the phlebotomus fever described by Birt but articular pains appear to be more frequent and severe. An eruption is often present, but this is very variable, rare in the Dardanelles cases, common in other areas; in position and amount it is like that seen in dengue cases in India. Convalescence is slow, attended with asthenia and articular pains. A relapse similar to the primary attack but of less intensity is frequently noted about the fifth day after the fall of temperature. The only blood change noted is a slight leucopenia; there are no parasites and no evidence of specific antibodies.

[There seems little to differentiate this disease from ordinary Phlebotomus fever.]

P. W. B-S.

Sarrailhé (A.). **Dengue et fièvre de trois jours.**—*Bull. Soc. Path. Exot.* 1916. Dec. Vol. 9. No. 10. pp. 778–794. With 8 charts.

During six months of the Dardanelles campaign of 1915, the author studied an epidemic of phlebotomus fever. In the summer and early autumn of 1916 in western Macedonia there were many local outbreaks, one of which he was able to observe carefully. The Dardanelles and Macedonian forms differed slightly. The former was generally called dengue by English doctors who recognise a definite distinction between this disease and phlebotomus fever. The experience of the author convinced him that the diseases are one and the same, at least as seen in the Eastern Mediterranean. He analyses the symptoms and shows how similar they are in most respects. The classical features of dengue with eruption and secondary fever are absent in many so-called dengue outbreaks. In Macedonia the eruption was present without secondary fever, in contradistinction to the type seen in the Dardanelles, with secondary fever and no eruption. The author however goes on to show that in practically all the cases the onset of the disease was in the hot summer months with the advent of abundant phlebotomus flies, and that the incidence was always greatest among those living in or near buildings with stone walls, and not in open camps. In the Dardanelles and at Sed-ul-Bahr mosquitoes (and malaria) were almost absent, but when the phlebotomus (*P. perniciosus*) came in quantity, so did the three day fever. At Oreovica (Macedonia), an epidemic of dengue in 1916 coincided absolutely with the appearance of enormous numbers of phlebotomi which were undoubtedly the carriers of infection; the same was noticed at Salonika, so that a short fever was present frequently with an eruption like that of dengue, in which the onset coincided with that of the sand-flies and not of Culicidae. This fever he terms "Mediterranean Dengue" and proceeds to give a detailed account of the symptoms which are, sudden onset, flushed face, general pains, anorexia, polymorphic eruptions, mostly dorsally placed

but sometimes absent, fever lasting three days, rarely five days, slow convalescence and occasional relapses on the fourth or fifth day after the fall of temperature. The treatment is protection from the bites and avoidance of the haunts of the phlebotomus flies.

[The term "Mediterranean Dengue" is not a happy one if the fever is not dengue, but really only a special type of phlebotomus fever, which it appears to be.]

P. W. B-S.

King (W. W.). i. **The Epidemic of Dengue in Porto Rico; 1915.** —*New Orleans Med. & Surg. Jl.* 1917. Feb. Vol. 69. No. 8. pp. 564–571.

ii. **The Clinical Types of Dengue in the Porto Rico Epidemic of 1915.** —*Ibid.* pp. 572–589. With 11 charts.

i. The source and nature of the epidemic which appeared in Porto Rico was for some time uncertain and the author was directed to examine and report. He first showed that the disease was true dengue, and that though it appeared at Havana and Bermuda about the same time, its origin was probably local, dengue being apparently endemic in Porto Rico; the greatest difficulty and the point of most importance consisting in differentiating the disease from yellow fever and preventing much local and general disturbance of trade, etc. The types of fever were very diverse and various diagnoses were made, such as yellow fever, three day fever, seven day fever, pappataci fever, malaria, etc. The outbreak commenced in September, 1915, and spread rapidly and widely. Statements of malarial cases without parasites, cured by quinine, but in which the drug often caused a rash, were very suggestive of dengue. The epidemic reached its highest point at the end of October and terminated in February. Many thousands were affected but the death rate was not increased. No sex or race disposition was noticed but the season was unusually hot and dry, favouring the presence of a greater number of mosquitoes (Culex) than usual. The incidence was highest in children and young adults; few persons over fifty years of age were attacked.

ii. The author states that he has complete notes of 41 cases. He describes four types: (1) "Evanescent," lasting one to three days; (2) "Interrupted fever" type; (3) "Saddle back" type or classical form; and (4) "Continued fever" type. The view held by Rogers that dengue is a three day fever in contradistinction to his "seven day fever" is not accepted by the author, the duration of the pyrexia in dengue being so variable. He also found that the pulse rate was of little diagnostic value. A terminal rash was seen in 82 per cent. of the cases observed by him personally, but this in some instances was easily overlooked and when the eruption was fading itching was not uncommon. As a help to diagnosis from yellow fever, an early leucopenia with a lymphocytosis was found in dengue. During convalescence, if protracted, nervous sequelae were sometimes troublesome.

P. W. B-S.

Kraus (Rudolf). **Ueber die Festellung der Dengue in Argentinien.** [Existence of Dengue in Argentine.]—*Deut. Med. Woch.* 1916. Oct. 26. Vol. 42. No. 43. pp. 1314–1315. With 2 figs.

In February, 1916, an epidemic appeared in Concordia (Entre Rios Province), and in Salto (Uruguay), which attacked the whole population and was diagnosed as dengue, a disease which up to that time had not been recognised in Argentina. The infection was supposed to have been imported directly from Spain. Further investigations brought to light the fact that periodic epidemics were known in Corrientes in 1911 or earlier. At the time of the epidemic mosquitoes were unusually abundant. The general characters were, fever, pains in the head, eyes, muscles and joints with a polymorphic eruption (like measles or scarlet fever), followed by slight desquamation. The convalescent stage was worse than the febrile, but there were no complications and no deaths. The blood showed a leucopenia but no parasites. Both *Culex fatigans* and *Stegomyia fasciata* were common and were possible conveyors of the infection.

P. W. B-S.

Schilling (V.) & Schiff (F.). **Ueber Papatacifieber.**—*Deut. Med. Woch.* 1916. Nov. 9. Vol. 42. No. 45. pp. 1378–1380. With 6 charts.

The observations were made at a base hospital in Turkey where an epidemic was present. The cases were at first variously diagnosed as malaria, recurrent fever, influenza, and dengue. The symptoms described are those generally recognised for phlebotomus fever—a short pyrexial attack with rapid rise and more gradual fall, vomiting, pains in the head, limbs and muscles and an early leucopenia with lymphocytosis and eosinophilia but without any rash and rarely any relapse (two cases). All the patients had been bitten by sand-flies (*P. papatasii*).

Those who had been two years in the locality had an immunity. Aspirin was useful to relieve the symptoms. The cases commenced a few days after the appearance of the sand-flies in May, and prophylaxis was dependent upon their destruction.

P. W. B-S.

Delanoë (F.). **Existence de *Phlebotomus papatasii* Scopoli à Mazagan.**—*Bull. Soc. Path. Exot.*, 1916. Vol. 9. No. 10. pp. 762–763.

During the months of June and July, 1915, the author captured four female examples of *P. papatasii* on the bed of his son aged four years, one gorged with blood. The boy afterwards developed a three day fever but, he states, no deduction can be drawn from a single case. This is the first time that phlebotomi have been recognised in the west of Morocco.

P. W. B-S.

Shattuck (George C.). **Diagnosis of "Three Days Fever."**—*New Orleans Med. & Surg. Jl.* 1917. Feb. Vol. 69. No. 8. pp. 559–564. With 5 charts.

The author while working in the Paget Hospital near Skoplje, Serbia, observed many cases of short fever which were difficult to

diagnose. Preceding and following typhus epidemics mild forms of fever are common and these are described as like influenza. A careful study, however, showed that during June and July many of these short fevers were probably cases of pappataci fever which often occurred in typhus immune subjects.

P. W. B-S.

MEGAW (J. W. D.). **A Case of Fever resembling Brill's Disease.**—*Indian Med. Gaz.* 1917. Jan. Vol. 52. No. 1. pp. 15–18. With 1 chart.

The case described is that of a European who was travelling from Almora to Lucknow. He stopped one night at Bhawali (altitude, 5,500 ft.) three miles from Bhim Tal. In the morning he found a tick attached to his neck; this was cut off. At Lucknow 21 days later he was attacked by fever which lasted 14 days. On the fifth day a diffuse macular erythema was noticed all over the body with swelling and tenderness of the skin, and on the eighth day the spots were petechial. The eruption faded away with the fall of the temperature and convalescence was rapid. Blood examination gave no evidence of malaria, typhoid or paratyphoid, and cultures were sterile; 0·5 cc. injected into a monkey gave negative results. The disease at first suggested typhoid but later Rocky Mountain fever of the Idaho type. From the district where the patient was bitten MACKECHNIE has investigated a local fever which he calls Kumaon fever [unpublished report], to which this case evidently belongs, and believes it to be a type of typhus, but it differs from this in being endemic, little contagious, and having a low mortality. In recent literature a typhus-like group of fevers has been described, Brill's disease of New York, Rocky Mountain fever, McNaught's South African fever,* MacKechnie's Kumaon fever and the macular fever of Tunis. They can be divided into two groups: typhus fever and Rocky Mountain fever, Montana type, having a high mortality; and all the remainder in which the mortality is low. The characters of these are distinctly shown in the table given on the following pages.

The term Brill's disease would be better applied to the second group than that of Paratyphus which is sometimes used. It is probable that the cause is an invisible virus conveyed from man to man or another animal to man by a biting insect or tick.

P. W. B-S.

KERSTEN (H. E.). **Nachtrag zu meiner Arbeit: "Die pockenverdächtigen Erkrankungen in Rabaul im Februar 1914."** [Pseudo-Smallpox in Rabaul in Feb. 1914. Addition to Former Article.] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Feb. Vol. 20. No. 3. pp. 58–59.

In a previous article [this *Bulletin*, Vol. 6, pp. 315–6] the author described an epidemic disease in Rabaul something like but differing from true small-pox. He showed that the infection was brought from Australia, but he suspected that the disease in Australia was not true small-pox but the same pseudo-small-pox or Sanaga

* *Jl. Roy. Army Med. Corps.* 1911. Vol. 16. p. 505–14.

MEGAW, J. W. D.]

TABLE OF THE TY

——	MY CASE.	MacKechnie's Cases.	McNaught' Cases.
Locality	? Kumaon Hills ..	Kumaon Hills ..	South Africa
Incubation period ..	? 20 days	?	?
Onset	Gradual	Rapid as a rule ..	Sudden ..
Mode of infection ..	? Tick	? Fleas	....
Climax	6th day	Average 7th day ..	"2nd or 3rd generally later
Eruption appears ..	4th day	3rd to 5th	....
Character of eruption	Maculo - Erythema, later petechial.	Roseola : later sub-cuticular macular.	Dark red : Ma papular.
Duration of eruption	Faded at crisis : staining lasted 5 weeks.	Fades at crisis ..	Leaves a brown
Symptoms	Weakness : headache ; pain in back.	Prostration ; head-ache.	Prostration ; times head pains in back
Delirium	Absent	Occasional, especially in children and natives.	Absent ..
Gastro-intestinal symptoms.	Constipation ..	Constipation ..	Constipation
Respiratory symptoms	Absent	Bronchial catarrh common.	....
Duration of fever ..	11 days	10–15 days in most ; average 12½ days.	10–14 days ..
Termination ..	Lysis	Rapid lysis or crisis	Rapid lysis or
Mortality	Case suggests very low mortality.	Low ; under 5% ..	*Nil.*
Convalescence ..	Rapid	Rapid	Rapid ..
Blood cultures and Widal.	Negative	Negative	....
Animal experiments .	Not conclusive ..	....	....
Blood counts ..	Leucocytosis : large mononuclear increase.	No apparent leucocytosis.	....
Authorities quoted ..	Self	MacKechnie ..	McNaught ..

* The Montana disease

Related Fevers.

ky Mountain ver (Idaho).	Brill's Disease.	Macular Fever of Tunisia.	Typhus.
.. ..	New York	Tunisia	World-wide.
days	?	....	About 12 days.
or gradual ..	Rapid	Sudden	Abrupt.
.. ..	?	....	Body lice.
2th day ..	3rd–4th day ..	....	3rd to 5th day as a rule.
th day ..	5th–6th day ..	2nd–4th day ..	3rd to 5th day.
o - Erythema : petechial.	Dull-red : Maculo-papular.	Rose red or dark red	Papular rose-spots, becoming markedly petechial.
at crisis : s a brown for 3 weeks or	Fades rapidly at crisis.	A few days ; often persists for several days.	?
ration : head- ; pains in back.	Prostration : head-ache.	Rigors ; pain in joints ; nausea, vomiting.	Early prostration ; headache ; pains in back.
tional ..	Not mentioned ..	Not mentioned ..	Marked in most cases.
pation ..	Constipation ..	....	....
hitis common	....	....	Bronchitis common.
4 days.	12–15 days ..	About 14 days ..	Average 14 days.
.. ..	Critical fall ..	....	Crisis as a rule.
.. ..	Very low	Almost *nil*	10–20% or more.
.. ..	Rapid	....	Rapid.
....	Negative	....	Negative.
....	Monkeys susceptible	....	Filterable virus affecting monkeys.
leucocytosis..	....	Lymphocytosis ..	Leucocytosis (average 24,000). Relative mononuclear increase.
bon and llani.	Brill	Conor, Bruch and Hayat.	Castellani and Clifford Allbutt.

high mortality.

small-pox of PLEHN which he was observing at Rabaul, for the death-rate was only 2 per cent. Shortly after the occupation of Rabaul by the Australian forces, fresh cases appeared having the same clinical characters as those seen in the epidemic areas in Australia. He states that in medical circles the disease was considered to be allied to chicken-pox, but officially it was passed as small-pox. He makes some remarks against the Australian doctors which are ungenerous, an instance of Teutonic feeling uncommon in scientific papers. He concludes with the statement that the disease in Australia was not true small-pox but a related affection with a low mortality. As vaccination was almost compulsory the people as a whole would benefit by being protected against small-pox should it in the near future be introduced, as Australia is virgin soil for that disease.

P. W. B-S.

POLECK. **Epidemiologische Betrachtungen und ueber eine schwere und ausgebreitete masernartige Epidemie in der deutschen Kolonie Samoa im Jahre 1911.** [A Heavy and Widespread Epidemic resembling Measles in the German Colony of Samoa in 1911.]—*Arch. f. Schiffs- u. Trop.- Hyg.* 1916. Aug. Vol. 20. No. 15. pp. 345–367. With 1 chart.

A disease called by the author "Toga Measles" appeared in Samoa in the spring of 1911. It was neither true measles nor German measles and resembled most the infectious erythema of STICKER but differed from this in having a much higher mortality, 7·4 per cent.

Out of a population of 36,000 there were 225 cases among adults and 8,617 among children, giving an incidence rate of 25·5 per cent., with 645 deaths. The incubation period is 18–19 days; the rash comes out on the first day and resembles that of measles. It disappears usually on the third or fourth day and is followed by slight desquamation without itching. Koplik's spots were never observed and there is no glandular enlargement. Cough is present but gradually decreases. The pulse is small at the height of the fever and faster than the temperature would indicate. The complications are broncho-pneumonia, otitis media, jaundice, and parenchymatous nephritis. During convalescence there is a tendency for pulmonary tuberculosis to become manifested, probably due to old lesions breaking down.

No etiological cause was discovered by blood examinations but the infection is believed to have been introduced from New Zealand.

P. W. B-S.

HURST (Arthur F.). **Trench Fever: A Relapsing Fever occurring among the British Troops in France and Salonica.**—*Lancet.* 1916. Oct. 14. pp. 671–675. With 6 charts; and *Jl. Roy. Army Med. Corps.* 1917. Feb. Vol. 28. No. 2. pp. 207–219.

Among the troops both in France and Salonika there has been a very large number of cases which for the want of a better name were entered as P. U. O. In France one class of them was investigated by MCNEE, RENSHAW and BRUNT and was termed Trench Fever as they were associated with, but not necessarily dependent upon, trench work and were found by those observers to be due to a blood infection

directly transmissible. Similar forms were found at Salonika before any trench work was carried out but were evidently due to the importation of the disease from France and Serbia. Practically in all cases infestation by lice was found and by these insects the disease was evidently conveyed from man to man. Two types of this "trench fever" are easily separated—a short form of three or four days duration with a single relapse after an interval of about four days, in which convalescence is rapid, and a long or periodic type distinguished by short but moderately severe pyrexial attacks, and frequent relapses. The intervals vary between four and eight days, generally five days; each relapse tending to become less intense.

The total duration of the illness is about 4–6 weeks. The most noticeable symptoms are painful and tender shins, so much so that it is occasionally described as "Trench Shins," the pains being present without fever.

The cases have to be diagnosed from influenza, malaria and relapsing fever; the latter occurs occasionally in the endemic area, but the symptoms are generally much more severe and the spirochaete is as a rule easily found in the blood. The prognosis is good and complications are few; phlebitis, dilated heart and albuminuria have been noticed. Prevention centres on the extermination of lice and treatment is directed to relief of pain, acetyl-salicylic acid being the most effective drug. Salvarsan has proved useless.

[It would appear probably that the long or periodic type is the same disease as that described elsewhere as five day or Volhynia fever. In descriptions of the latter disease, WERNER has also called attention to cases with symptoms but no fever.]

P. W. B-S.

RUMPEL (Th.). **Ueber periodische Fieberanfälle bei Kriegern aus dem Osten.** [Periodical Attacks of Fever in Soldiers on the Eastern Front.]—*Deut. Med. Woch.* 1916. June 1. Vol. 42. No. 22. pp. 657–660. With 5 charts.

The author divides these fevers into three classes, (1) febrile attacks, lasting 2 or 3 days, probably mostly influenza; (2) continuous fever lasting 4 to 10 days, possibly modified typhoid; (3) periodical febrile attacks in which bacteriological, serological and protozoological investigations gave no results. It is the last series that are specially treated, and five cases are described. The first was like an atypical typhoid, the second possibly a case of recurrent fever. The first three had none of the symptoms of "five day fever" but the fourth and fifth were more interesting. The fourth had a typical temperature chart of five days fever which was apparently contracted in the hospital train as the fever commenced fourteen days after leaving the front. Case five was a Russian prisoner who contracted the fever in a prison camp where it was prevalent. Some of the intervals between the attacks were as long as nine days, and pains in the shins were marked. Very careful observations on the blood appear to have been made in all the cases and a leucocytosis was generally associated with the febrile attacks.

P. W. B-S.

Benzler (Jobert). **Blutuntersuchungen beim sogenannten Fünftagefieber.** [Investigation of the Blood of Cases of So-Called Five Day Fever.]—*München. Med. Woch.* 1916. Aug. 29. Vol. 63. No. 35. pp. 1276–1277.

This is a supplement to Werner's first communication on the subject of the blood changes in five day fever. The most important features observed were: (1) no marked change in the erythrocytes; (2) an increase in the leucocytes, mostly of the neutrophiles, during febrile attack. In the intervals there was a lymphocytosis with an increase in the number of the mononuclear cells, and an increase in the eosinophiles observed frequently but not constantly. Malarial parasites and spirochaetes, if present, have no etiological relationship to the disease and are due to mixed infections. The numerous other parasites that have been described by Korbach, Brasch and others were not seen by the author.

P. W. B–S.

i. Korbsch (R.). **Zur Kenntnis der Febris wolhynica.**—*Deut. Med. Woch.* 1916. Oct. 5. Vol. 42. No. 40. pp. 1217–1219. With 6 charts & 2 figs.

ii. Galambos (A.) & Rouk (J.). **Febris wolhynica an sudwestlichen Kriegsschauplatz.** [Wolhynia Fever on the South Western Front.] —*Berlin. Klin. Woch.* 1916. Nov. 13. Vol. 53. No. 46. pp. 1236–1237. With 1 fig. & 1 chart.

iii. Frese (O.). **Ueber im Westen beobachtetes sogen. Fünftagefieber.** [The So-called Five Day Fever on the Western Front.] —*Deut. Med. Woch.* 1916. Oct. 12. Vol. 42. No. 41. pp. 1247-1249. With 7 charts.

iv. Linden. **Ueber Fünftagefieber.**—*Berlin. Klin. Woch.* 1916. Oct. 30. Vol. 53. No. 44. pp. 1191–1193. With 2 charts.

v. Jahn (Friedrich). **Ueber wolhynisches Fieber.**—*Deut. Med. Woch.* 1916. Oct. 12. Vol. 42. No. 41. pp. 1249–1251. With 4 charts.

vi. Zollenkopf (Georg). **Eine neue, dem Wechselfieber ähnliche Erkrankung.** [A New Disease Resembling Intermittent Fever.] —*Deut. Med. Woch.* 1916. Aug. 24. Vol. 42. No. 34. pp. 1034–1036. With 1 fig.

vii. Toepfer (H.). **Zur Ursache und Uebertragung des Wolhynischen Fiebers.** [The Cause and Carriers of Wolhynia Fever.]—*Münch. Med. Woch.* 1916. Oct. 17. Vol. 63. No. 42. pp. 1495–1496. With 1 fig.

i. This disease, which has been called on the western front "Meuse fever," has been previously described by the author. After a year's experience he gives its characteristics: sudden onset, herpes, pain in the abdomen like that of appendicitis, rareness of pulmonary symptoms, frequent cardiac changes, fever generally lasting three days, but occasionally as long as six, anaemia, severe bone pains, and efficacy of arsenical preparations. It belongs to the recurrent fever type. Etiological factors:—The most common organism found is the diplococcus described by Brasch, often seen in "pearl necklace chains." Also he describes "interrogation sign bodies," 10μ long, with many nuclei, but whether these nucleated spirochaetes

are distinctive of the fever is still doubtful. He states that in all cases lice were present. The largest number of cases occurred in the winter months. It is a place disease, and if an infected house is thoroughly cleaned the disease does not recur. Tests for infection through lice were by personal trials unsuccessful.

ii. The author describes a single case, admitted as typhoid. The symptoms were of the usual type but complete analgesia, and anaesthesia, was present between knee and foot. There were three relapses, the intervals being four days. In the blood the diplococci were found. These were Gram-positive and were successfully cultivated in broth.

iii. The author describes cases observed by himself in northern France. The fever curve was generally five days and the free intervals shorter. If two hourly observations are made the rise and fall of temperature is seen to be gradual, unlike malaria; no enlargement of the spleen was noticed. In one case he observed a roseola-like eruption coming on at the end of an attack, increasing in the interval. No parasites were found in the blood. He suggests that the infective agent is a protozoon which infects the long bones and causes the pains. Neosalvarsan, aspirin, and pyramidon were of slight value.

iv. The author states that the disease occurs not only in Wolhynia but also in the northern part of the eastern front. Four cases are reported; two were exactly like those described by WERNER; the other two showed remarkable variations, one having tetanoid spasms, possibly a mixed infection. The fourth was contracted from the last mentioned; he had three attacks of fever with typical symptoms. Blood examination showed neither spirilla nor malarial parasites, but marked leucocytosis.

v. The author records ten cases which occurred in eastern Galicia, two km. behind the front. These had characteristic fever charts. Rheumatic symptoms were frequent, but only a few of the cases had typical symptoms. The report is very incomplete.

vi. The disease, which was new to the author, is described as a fever which recurs every 4 or 5 days and is easily mistaken for meningitis at first, but the symptoms as described are similar to those generally given for this fever. He describes changes in the red cells, blue dots and rods, as many as 8 or 12 in a corpuscle. These disappear after the fever, and may be only basophilic granules of the erythrocytes.

vii. The author commences by stating that the organisms described by HISS and WERNER as the cause of Volhynia fever were accidental impurities. He had seen in a very large number of cases of this fever that besides a leucocytosis the blood contained small parasitic bodies but these were not diagnostic. He was however convinced that the virus circulated in the blood and therefore carried out experiments with guinea pigs and by injecting 5 cc. of blood intra-peritoneally obtained similar temperature curves as found in those injected with blood from typhus patients.

It was evident that lice were the probable vectors. He found that lice taken from typical cases of the fever contained in their gut bodies similar to the typhus fever organism. He was also able to demonstrate in all cases the same bodies in lice which were experimentally fed on the fever patients. These were only isolated *after* the fifth day; after the eighth day they were very numerous. The parasite, though similar to the typhus organism, is distinct. They were found both

free and inside the cells and appear as small short rods ; double forms and polar stained rods could be demonstrated. He believes them to be bacilli and not protozoal organisms, and considers that they are the exciting cause of the disease. He suggests that typhus and Volhynia fever belong to a new group of diseases, that they are distinct from one another, but from their form, development and mode of conveyance they have an etiological relationship.

[In a paper on the etiology of typhus, *ibid.* No. 45, p. 1383, the author describes the organism found in tissues of typhus patients, and in infected lice as intra-cellular diplo-bacilli].

P. W. B-S.

Weisbach (Walter). **Einige Beobachtungen über fieberhafte Erkrankungen auf dem Balkan.** [Some Observations on a Febrile Disease in the Balkans.]—*Münch. Med. Woch.* 1916. Oct. 3. Vol. 63. No. 40. pp. 1435–1436. With 9 charts.

In the summer season, a form of fever rather similar to that described as five day fever was noticed in the German forces in the southern part of Macedonia. A number of temperature charts of the cases are given, several of which very closely resemble the type seen in phletobomus infections. The differential diagnosis from other fevers of short duration is obscure, but the author favours the view that these are due to toxic infections of an intestinal origin and that free purgation is the essential form of treatment.

P. W. B-S.

Chambers (Graham). **Continued Fevers of Obscure Origin occurring among the Soldiers of the British Forces in Greece.**—*Jl. Roy. Army Med. Corps.* 1916. Nov. Vol. 27. No. 5. pp. 627–635. With 2 charts.

The observations were made on a number of cases of fever of uncertain origin which were observed during the period of two months at a base hospital in Greece. They are divided into three types.

Type 1. Fairly common, the chief features being continued fever, usually of a mild type, enlargement of the spleen, and a slight lymphocytosis ; Type 2. Rare. Fever with a sudden onset and characterised by the presence of leucopenia, normal blood count, or occasional eosinophilia ; Type 3. Common. Fever of a continued, intermittent, or relapsing form of long duration, associated with a neutrophilic leucocytosis in the early stages. The author suggests that in types 1 and 2 the cause is contaminated food or water, as they resemble fevers of the typhoid or paratyphoid groups but do not agglutinate for these organisms. The origin of type 3 is still quite obscure ; possibly they are general infections caused by a bacillus of the dysentery group.

P. W. B-S.

Kitakawa (T.). [**Rat-Bite Disease, Spirochaete found in Cases of.**]—*Saikin Gaku Zassi.* 1916. June 10. No. 249. p. 75. (Abstract based upon Review by R. G. Mills in the *China Med. Jl.* 1917. Vol. 31. No. 1. p. 69).

From the axillary gland removed from a patient suffering from rat bite disease at the height of the fever preparations inoculated into

monkeys caused a rise of temperature in ten days, and after eleven days in guinea-pigs. After the fever had lasted two or three days the animals were killed and the organs examined. A spirochaete differing from that found in the saliva of the rat was present most abundantly in the kidneys. Using an alcoholic extract of the liver of an infected guinea-pig with the patient's serum, a positive complement deviation was obtained in two cases. The serum of a syphilitic patient failed to fix the complement with this antigen. Two types of spirochaetes were observed, one very active, the other sluggish. Some were pointed at the end, and others blunt. No differences in staining were noted.

P. W. B-S.

Ishihara (K.), Otawara (T.) & Tamura (K.). **[Rat-Bite Disease, Demonstration of the Spirochaetes in Healthy Rats.]**—*Tokyo Igakkwai Zassi.* 1916. July 20. Vol. 30. No. 14. pp. 52–54. (Abstract based upon Review by R. G. Mills in the *China Med. Jl.* 1917. Vol. 31. No. 1. p. 79).

The authors have shown that in marmots bitten by rats the kidneys contain spirochaetes. The marmots when bitten by infected rats develop fever and two days later spirochaetes are found in the blood. Inoculations of the blood gave positive results with other rats, mice and marmots. Almost one fourth of the rats (*Mus decumanus*) examined were found to contain the same spirochaete. Three specimens of the *M. Alexandrianus* when examined were also found to be infected.

P. W. B-S.

Ishiwara (Kikutaro), Ohtawara (Toyoitsiro) & Tamura (Kotaro). **Experimental Rat-Bite Fever. First Report.**—*Jl. Experim. Med.* 1917. Jan. Vol. 25. No. 1. pp. 45–64. With 1 plate & 7 charts.

Ogata (1909) was the first to demonstrate that rat-bite fever could be conveyed to guinea-pigs by making infected rats bite them. The present work is a continuation of his experiments. The authors found that the rats caught could be divided into two classes, those that bite and those that did not. Of the former only a few were able to convey infection; of 80 rats examined only 10 were infected, all *Mus decumanus*, but they were never able to find the spirochaetes in the mouths of the animals and only once in the blood. Guinea-pigs were used for the experiment. The bitten parts became swollen within two or three days and generally continued so until death. A slight rise of temperature was noticed within 24 hours; this soon fell to normal but was liable to relapse once or more often. The subcutaneous lymph glands became enlarged and there was loss of weight.

The most important post-mortem characteristics were acute changes in the adrenals and kidneys. The virulence of the infection was increased by passage through guinea-pigs, and rats and mice are easily infected by inoculation but do not die. Rats and mice are media of infection but not victims; guinea-pigs are both. The course of infection in a monkey was similar to that seen in man, and spirochaetes were again found in animals inoculated with blood taken from it. In the animals used spirochaetes were found in the peripheral blood

four or five days after inoculation and increased in number up to the tenth day when they began to decrease but could be found two months later. The spirochaetes appear to be present chiefly in the adrenals but fuller research is required to demonstrate their distribution. The organism is short with few spirals, is highly motile and stains well, a flagellum at each end being observed.

The authors do not as yet attempt to identify their species, but believe that it differs from that described by Futaki, Takaki and Osumi.

[With the latter the infection of guinea-pigs was uncertain, whereas with the authors the organism appears to be pathogenic to these animals. Morphologically no distinction is evident between the short form of both.]

P. W. B-S.

Futaki (Kenzo), Takaki (Itsuma), Taniguchi (Tenji) & Osumi (Shimpachi). *Spirochaeta morsus muris*, **n. sp., the Cause of Rat-Bite Fever. Second Paper.** — *Jl. Experim. Med.* 1917. Jan. Vol. 25. No. 1. pp. 33–44. With 3 plates.

In their first paper the authors reported the discovery of a spirochaete in the blood, skin, and lymph glands of four patients suffering from rat-bite fever [see this *Bulletin*, Vol. 7, p. 160]. They have examined five more cases, finding the spirochaetes in each, in two of them in the circulating blood. A full description of the spirochaete is given, which is larger than *S. pallida* and smaller than *S. recurrentis*. It is very motile, stains well, and there is generally a single flagellum, well shown in the plates, at each end, but no undulatory membrane. The curves are regular and range from 2 to 19, generally 3 or 4 ; the smaller forms are found in the blood, and the larger in the tissues.

Mice are best used for experimental inoculations, white rats are next, guinea-pigs and monkeys often fail to become infected. Virulence is increased by passage through mice or rats. A mouse, if inoculated with human material, becomes infected in from seven days (earliest) to a month, when it shows the spirochaetes in the blood ; if it is inoculated from an infected mouse they may be seen in four days ; as a rule the animals recover.

The type of fever which is produced in monkeys is not typical of the fever in man. Salvarsan cleared the blood in 14 days but relapses then occurred in two animals experimented upon.

The organism is not found in the blood of all rats and is never present in healthy guinea-pigs or mice, but if an infected rat bites a guinea-pig the latter may develop the disease and show the spirochaetes. The authors were able to cultivate the organism in Shimamine's medium. They consider that this spirochaete, which is found in 3 per cent. of house rats, differs from all others which have been described from the blood of mice and rats and they have therefore termed it *S. morsus muris, N. Sp.*, the cause of rat-bite fever of Japan. The plates are excellent but show extraordinary variations in form of the spirochaete, some with open curves like *S. refringens*, others bent and close curved like *T. pallidum*.

P. W. B-S.

TUNNICLIFF (Ruth). **Streptothrix in Bronchopneumonia of Rats Similar to that in Rat-Bite Fever.**—*Jl. Infect. Dis.* 1916. Dec. Vol. 19. No. 6. pp. 767–771. With 3 plates.

The occurrence of streptothrix organisms in the broncho-pneumonia of rats and of similar organisms in man suffering from rat-bite fever or sodoku is of very considerable practical interest. The author therefore examined 60 white rats which showed evidences of acute or chronic broncho-pneumonia and in 56 a long, fine, straight, wavy, filamentous organism was observed which was never found to be present in 24 normal rats. It is Gram negative, not acid fast and stains with difficulty, best with Giemsa and carbol fuchsin and also by Levaditi's method in tissues. A pure growth was isolated thirteen times ; these were most successful when made from acute lesions when other bacteria were present. The morphological and cultural characters are described in detail and the organisms are well illustrated in the plates. In infected rats the production of antibodies was demonstrated both by opsonic and agglutination experiments. The organism was pathogenic to white rats but not to rabbits or guinea-pigs, and slightly to monkeys. As white rats are not known to cause rat-bite fever 28 wild rats were examined and the same organisms and lesions in the lungs were found in one of them as in the white rats. The author notes that in the Levaditi specimens made by her spirochaete-like forms were seen like those figured by FUTAKI from the skin of two cases of rat-bite fever, and probably the same as those described by SCHOTTMULLER and others as *Streptothrix muris ratti.*

P. W. B-S.

REMLINGER (P.). **Un cas de Sokodu observé au Maroc.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 120–123.

The occurrence of cases of rat-bite fever has been recognised in China, Japan, America, France, Italy, England and Germany, but this is the first recorded case from Africa. The patient was a child of two years old, born in Tangier and was bitten on the back of the right hand by a common rat. The onset of the fever took place twenty days after the injury. The child was taken to the Pasteur Institute for treatment against rabies. The symptoms were irregular fever, generalised papular eruption, lymphangitis, adenitis, and asthenia. No further etiological observations were made but the author states that probably there are many unrecorded cases, and it is possible that similar infection may be carried by other animals, squirrels and cats, but no cases are given in support of this view.

P. W. B-S.

Book Review.

Jackson (Thomas Wright) [M.D.]. **Plague, Its Cause and the Manner of its Extension—Its Menace—Its Control and Suppression—Its Diagnosis and Treatment.** With Bacteriologic Observations by Dr. Otto Schoebl. 192 pp. With Illustrations. Press of J. B. Lippincott Co. [Price not stated.]

From the "title page" we gather that in Dr. T. W. Jackson resides the spirit of adventure. He has collected experience under many conditions. At one time Lecturer on Tropical Medicine, at another Sanitary Officer in Manila, we find him, in 1914, answering the call which, with the outbreak of war, comes to "Red Cross" and to other voluntary ambulance societies. Among the international group of medical workers in Serbia, men and women, Dr. Jackson found Professor A. Castellani to whom this record of plague experiences is dedicated:—"To my friend, colleague, and comrade during strenuous days in Serbia."

For those who read the title and sub-title, a veritable "Table of Contents," there is only one surprise, viz., the "Introduction," wherein the author justifies the epiphany of another new book. Since this volume is a record of actual work done by Dr. Schoebl and the author-in-chief it may be rightly included among the "ninety and nine" that need no justification.

Plague, "that which strikes down," dates probably from the time when men gathered together in towns and rats became infectious under unnatural conditions and environment. It has slain more creatures than all the wars that disgrace mankind and has attained such evil eminence that it has become *the pest*, needing no qualification.

Dr. Jackson begins his account of the "History of Plague" with the second century B.C., but he might have found instances of much earlier date. About 1500 B.C. plague smote the Philistines in and around Ashdod, a punishment as they thought for detaining the Ark of Jehovah. So to rid themselves of the plague those whom Jehovah "smote with emerods" returned the ark together with votive offerings which in themselves tell us something about the disease, "five golden emerods and five golden mice," "images of your emerods and images of your mice that mar the land." A few hundred years later, according to some Bible students, plague as "the angel of the Lord, went out and smote in the camp of the Assyrians an hundred four score and five thousand; and when they arose in the morning, behold they were all dead corpses." This is a strange story and veined with poetic licence, but not impossible. The sudden death-stroke will not cause any surprise to those who have seen an epidemic of plague or even to those who only read the account of cases given by Dr. Jackson. About 900 B.C. the "Iliad" tells of an epidemic destroying man, beast and birds. This might have been plague and we know that fowls are liable to infection; also we may note that *Ceratophyllus gallinae* and *C. styx* are generically related to the cosmopolitan rat flea, *C. fasciatus*. And so down the ages the pest has been spread abroad by pilgrimages, crusades, railways and commerce with the going to and fro of ships and merchandise. For ages man accepted disease as a punishment for sin—a belief not extinct in certain parts of the East even now. They either bowed their heads and made "ex voto" offerings or they faced the storm with ignorant and rebellious hearts according to temperament. Even to-day the useful knowledge we possess, which if strictly applied would rid us of more than one scourge, is the property of the few. When even a good majority recognize that we are masters of fate and not its slaves we shall be able to abolish many serious diseases once and for all time.

Mr. James Waterston (British Museum pamphlet "Fleas") states that: "In all, eleven fleas have been, up to the present, proved capable of transmitting plague. Five of them are common British species, while a sixth, the Plague Flea *par excellence* (*Xenopsylla cheopis*), is occasionally introduced to our shores." Of these fleas, Dr. Wright Jackson mentions "*Pulex pallidus* (*Laemopsylla cheopis*) common under various names in

India, the Philippines, Australia, Italy, Brazil and in tropical countries generally," and "*Ceratophyllus fasciatus*, the common rat-flea of Great Britain and the United States." It will be noticed that in a few lines one flea has appeared under three names. It has others and this multiplicity leads to confusion. It is to be hoped that we shall one day accept one name for one creature in scientific nomenclature. Men of different nations, and also within the nations, seem to take a malicious pleasure in increasing these nominal difficulties. It is a childish pleasure and should be "put away." The control of rats, fleas and plague-stricken people is carefully considered. Rat-proof buildings are insisted upon and the methods of rat destruction described. The author's figures show that the spring-trap, which kills as it catches, is the best form of trap. Poisons are mentioned, in most cases to be rejected, at any rate in towns because of danger to others. He does not mention barium sulphate which is a good rat poison and is not dangerous (like some other barium salts) to men. The rat through misfortune rather than fault is often a real danger to mankind and must go from his haunts, but not without a word of pity for an animal that faces life bravely, without friends, a museum of parasites, the very Ishmael of rodents.

Dr. Jackson's experience of a plague epidemic was mainly obtained in Manila where he and his staff successfully fought the disease between the years 1912 and 1914. The author worked with Dr. SCHOEBL to help him as Bacteriologist. Pathological work was done by Dr. B. C. CROWELL and is published in another "Report." Dr. Jackson is entitled to every credit for his work and, writing as an American for Americans, he is even entitled to boast of success. American Sanitary Medical Officers have been most successful in dealing with recent and limited epidemics of plague, but it is unwise to suggest that other workers in other lands have failed because they have not recognised and applied methods which Dr. Jackson found ready to hand in 1912. In other countries there are problems, racial or religious, to face which are unknown in Manila. The reviewer's experience is limited to India (1884–1905) and one instance may be taken from the customs of the people. Armed even with "authority from the Surgeon-General," Dr. Jackson and his Sanitary gang would find it difficult, if not dangerous to introduce his methods, good as they are, into the "Purdah" regions of Indian dwellings.

Under "Types of Plague," the author writes of infection by "Ingestion." Of this method of infection, however, he says :—"Speaking practically, the possibility of infection through ingestion is nearly negligible." He then proceeds [pp. 29, 76, 150] to relate cases in which cats [laboratory cats ?] were infected through eating rats containing *B. pestis*. The histories are not convincing and there is nothing to prove that the cats (one with five kittens) were not infected in the usual way through fleas which passed from rats to cats. Most people know, especially if they live near a rabbit warren, that cats when bothered with fleas on head and ears scratch and in scratching make sores. Female cats are liable to sores behind the ears due to embraces from the male. Dr. Jackson suggests that the bacilli in the excreta of such cats might present a possible danger. This of course is possible, but the danger is lessened by the cleanly habits of the cat. If possible the excreta are buried and covered with earth. The reviewer has seen a ship's cat use the scuppers as a latrine and cover the excreta, so far as was possible with shavings, dust, etc., from beneath the carpenter's bench close by.

Demand of economy of paper at the present time demands economy of words and much of interest must be left unnoticed.

Let us now turn to the laboratory work supplied by Dr. SCHOEBL, pp. 127-154. It is excellent, "touched"—to borrow a phrase from FARADAY —"with Ithuriel's spear of experiment." Some of his conclusions may be quoted :—

"1. The importance of blood culture as a diagnostic means is evident from the fact that positive blood culture was obtained in practically every case that was examined in the febrile stage of the disease, even when buboes or signs of pulmonary involvement had not been detected clinically."

"3. The period of time during which *Bacillus pestis* circulates in the blood is evidently short and irregular."

"5. The agglutination test is of no value for the diagnosis of plague, as it was found positive only in convalescents."

Dr. SCHOEBL's statistics, p. 147, show that in the matter of infection it is with rats as with men, the weakly and diseased fall first. There must be grades of infection and many rats (or other plague bearing rodents) must defy plague or recover from its effects. The actual number of rats dead and dried up, found during an epidemic in the plague infected area, is small compared to the number caught and killed, examined and found to harbour *B. pestis*, and very small in proportion to the local rat population.

"More than half the rats examined harboured parasites in their organs. *Echinococcus teniaeformis* was found in the liver of practically every gray rat, while a small Ascaris and *Taenia diminuta* were not uncommon in the intestines. Two rats were found to have sarcosporidiosis, 2·6 per cent. showed rat leprosy, and 7·4 per cent. trypanosomiasis." Tumours were common.

The chapter on Diagnosis and Treatment is short, and rightly so. Of most drugs Dr. Jackson remarks that they should be "relegated to the department of historical medicine" and even into that realm they should not be admitted without scrutiny. With plague serum Dr. Jackson has had good results and it is the only treatment of real value. If there is a disease in which early treatment is valuable it is plague. Hesitate and the opportunity for doing good may be lost. The dose used for adults by Dr. Jackson is "from 300 cc. to 500 cc. by injection, 100 cc. being given every four hours. The injection may be either intramuscular or intravenous."

The author has full belief also in anti-plague serum as a protective:— "30 cc. to 50 cc." Plague vaccines are useful but less so than the anti-plague serum.

The illustrations are good and help to explain some of the constructional difficulties with which the Sanitary Staff had to contend. So far as it is a record of facts this is an excellent little book. The author's style is simple and terse making the work interesting to read and fixing the facts in the memory. If this review is not all praise it must be remembered that a reviewer is a critic and not an advertisement agent

The copy sent for review shows want of care in sewing and binding.

J. H. Tull Walsh.

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